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ABSTRACT

This report summarizes the 1998 reporting year data on the National Science Foundation's (NSF's) Graduate Research Traineeship (GRT) program. The GRT program supports the research and education of talented students pursuing graduate degrees in critical and emerging areas of science, mathematics, engineering, and technology (SMET) and SMET education. The GRT program has targeted its support, on an annual basis, towards fields in which an increase in the number of Ph.D. students is in the national interest. The program's objective is to stimulate the development of graduate training environments that simultaneously address areas of national science and technology priority and proactively build an infrastructure capable of promoting and sustaining student diversity. This 1998 outcomes report builds upon a baseline study that summarized the first set of data submitted by GRT projects through this web-based reporting system in 1997 as well as input collected during visits to selected GRT projects in the field. The major purpose of this report is to provide information useful for monitoring the GRT program. Data is also useful for measuring achievement toward NSF's Government Performance and Results Act (GPRA) Outcome Goal Number Three--creating a diverse, globally-oriented workforce of scientists and engineers. Chapters include: (1) "Introduction"; (2) "Implementation of the GRT Program"; (3) "Strategies Used to Recruit GRT Trainees and Enhance their Educational Experiences"; (4) "GRT Program Outcomes"; and (5) "Conclusion." An Appendix entitled "Other Data Obtained through the Graduate Research Traineeship (GRT) Program Distance Monitoring Survey" is also included. (MM)

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Directorate for Education & Human Resources
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Preparing a 21st Century Workforce for Science, Engineering, and Mathematics: Descriptive Outcomes of the Graduate Research Traineeship (GRT) Program

Prepared under Contract
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EXECUTIVE SUMMARY

This report summarizes the 1998 reporting year data about the National Science Foundation's (NSF's) Graduate Research Traineeship (GRT) program. The GRT program supports the research and education of talented students pursuing graduate degrees in critical and emerging areas of science, mathematics, engineering, and technology (SMET) and SMET education. The GRT program has targeted its support, on an annual basis, toward fields in which an increase in the number of Ph.D. students is in the national interest. The program's objective is to "stimulate the development of graduate training environments that simultaneously address areas of national science and technology priority and proactively build an infrastructure capable of promoting and sustaining student diversity." (NSF Graduate Research Traineeships Fiscal Year 1995: Announcement and Guidelines for Submission of Proposals, NSF 94-140, pg.1.)

GRT has funded four groups or "cohorts" of projects: 1992, 1993, 1994, and 1995, for a total of 92 postsecondary institutions that house 157 GRT projects. GRT awards to institutions are packages of student support, providing stipends and cost-of education allowances instead of tuition and fees that would normally be charged to the graduate students. The funded institutions select which students receive traineeships, determine the length of traineeship positions, and enhance the trainees' graduate education experiences through the development of various project features. Through these university partners, the GRT program has funded the enrollment of almost 1,600 doctoral students, as well as encouraged the development of numerous innovative features in the students' graduate training environments.

Data for this outcomes report were collected from all GRT projects by the program's web-based Distance Monitoring Survey System. This monitoring system collects quantitative and descriptive information regarding faculty and student project participants, strategies used to recruit trainees, other project features to enhance their educational experiences, and the institutional impact of the project.

This 1998 outcomes report builds upon a baseline study that summarized the first set of data submitted by GRT projects through this web-based reporting system in 1997, as well as input collected during visits to selected GRT projects in the field. The major purpose of this 1998 report is to provide information useful for monitoring the GRT program. Data will also be useful for measuring achievement toward NSF's Government Performance and Results Act (GPRA) Outcome Goal Number Three: creating a diverse, globally oriented workforce of scientists and engineers. The following are some of the findings drawn from analysis of the 1998 reporting year data.

Program Implementation

Enrollment. Minority enrollment in the GRT program was stable, decreasing only from 12 to 11 percent, between the 1997 and 1998 reporting years. Between those same years, the percentage of female trainees also decreased only slightly from 38 to 37 percent. The percentage of disabled trainees in those two reporting years remained the same, at 1 percent. The percentage of minority trainees in 1998 varied only slightly among the various cohorts, from a high of 16 percent (1994) to a low of 9 percent (1992 and 1995).

GRT Enrollment Compared to National Data. Comparison of data from the GRT Distance Monitoring Survey System with those from NSF's biennial Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS) for 1997 shows that the percentage of women participating in the GRT program (37 percent) was lower than the percentage of women graduate students in science and engineering overall in the country (43 percent).

Data from the same sources show that the overall rates of participation of GRT trainees and GSS respondents by race/ethnicity group varied by no more than 2 percent.

Project Features to Support Trainees' Educational Experiences. The percentage of GRT projects that reported efforts to recruit minority and female trainees increased over the reporting period. In the 1997 reporting year, 41 percent of projects reported using various strategies to recruit these groups. In 1998, about 38 percent reported visiting minority-serving institutions or women's colleges to recruit trainees, and 50 percent made some other effort to recruit trainees from underrepresented groups.

Projects placed increased emphasis on international opportunities for their trainees; 59 percent of projects reported such opportunities in 1998, compared to 38 percent in 1997. In

addition, initiatives to prepare their trainees for faculty positions were reported by 85 percent of projects in 1998, an increase from 54 percent in 1997.

Program Outcomes

Trainee Ph.D. Completion and Subsequent Employment. The cumulative percentage of GRT trainees who had completed their Ph.D.s by the 1998 reporting period was about 12 percent, almost double the cumulative completion rate reported in 1997. Completion rates were similar for males and females, but higher for nonminorities than for minorities (13 percent and 4 percent, respectively). This gap in cumulative completion rates between minority and nonminority trainees increased between 1997 and 1998.

Overall, the cumulative percentage of GRT trainees requiring 4 years or less to complete their Ph.D.s increased since the 1997 reporting year. In 1998, 21 percent of GRT trainees who had completed their Ph.D.s took 4 years or less to do so, compared to 12 percent in the 1997 reporting year.[1] On the other hand, the cumulative percentage of trainees who took 7 or more years to complete their Ph.D.s increased from 3 to 19 percent. The average time to complete the GRT Ph.D. (5.5 years) did not vary by gender or minority status. Almost half of the 194 trainees who completed a GRT-supported Ph.D. program by the 1998 reporting year were in postdoctoral positions. Most of the others were employed as educators or by private organizations.

Attrition and Employment of Trainees Who Left GRT Program Prior to Obtaining Ph.D. The cumulative percentage of GRT trainees by 1998 who had stopped their pursuit of a Ph.D. was 18 percent overall, an increase from the 10 percent rate in 1997. Minority students had a higher cumulative attrition rate than nonminority students (24 percent compared to 17 percent) in 1998. The most common reason for leaving the GRT program was to pursue employment; more than half of the Engineering and Computer and Information Sciences and Engineering trainees who left the program did so to pursue employment.

The 1998 data showed that trainees who left the GRT program before Ph.D. completion were most likely to be employed in the private sector (39 percent). Most of the others were in graduate school either at the GRT institution or elsewhere, or employed in the public sector or an academic setting.

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[1] The average time that students receive GRT funding is less than the number of years required to complete a Ph.D.

GRT Course Features. Projects continued to develop courses and/or curricula that will remain with the GRT-funded department after the GRT project has ended. A total of 316 new courses, other institutional offerings, or course requirements were developed by the 157 GRT projects during the 1998 reporting year alone. These institutional outcomes are in addition to the 1,061 that had already been reported during the 1997 reporting year for all years of project operation prior to the 1998 reporting year.

As more trainees complete their Ph.D. programs, subsequent years of GRT trend data should provide additional useful information about subsequent employment in the workforce. Along with related analyses, such data should contribute to NSF's assessment of the GRT program investment and of related agency endeavors, in support of postdoctoral activities.

Finally, in addition to this report on outcomes of the GRT Program, Abt Associates has prepared a report based on site visits to selected GRT projects. This report also is available through the NSF On-Line Publications website.

1. INTRODUCTION

As part of the process of change in affirmative action laws, policies and practices that began in the mid-1990s, state legislatures, higher education commissions, and individual universities continue to grapple with the design and implementation of effective and legal strategies to recruit and retain a sufficient and talented student population to meet the workforce demands of the next century in the science, mathematics, engineering, and technology (SMET) fields. Simultaneously, research both within and outside of SMET fields is contributing to a refinement of strategies that promise to improve education for SMET professions generally, while also holding special promise for the retention of individuals from groups that are currently underrepresented in these fields.

Government Performance and Results Act

The National Science Foundation (NSF) has positioned itself at the forefront of these activities with the development of agency-wide outcome goals that were established in response to the Government Performance and Results Act (GPRA) of 1993. NSF's GPRA Outcome Goal Number Three for FY 99 was to create a diverse, globally oriented workforce of scientists and engineers.[2] Indicators measuring success for this goal are that 1) participants in NSF activities experience world-class professional practices in research and education, using modern technologies and incorporating international points of reference, and 2) the science and engineering workforce reflects increased participation of women, minorities, and persons with disabilities in fields where their participation traditionally is low.

One NSF program that addresses Goal Three is the Graduate Research Traineeship (GRT) program, which funds projects that support the research and education of talented students pursuing graduate degrees in critical and emerging areas of SMET and SMET education. NSF-awarded institutions select which students receive traineeships, determine the length of traineeship positions, and enhance the trainees' graduate education experiences through the development of various project features.

[2] National Science Foundation. March 1998 (updated January 1999). FY 1999 GPRA Performance Plan. Available online: http://www.nsf.gov/cgi-bin/getpub?nsf99gprapp.

GRT programmatic funds have been awarded to four groups or "cohorts" of projects: 1992, 1993, 1994, and 1995. This Descriptive Outcomes report presents selected quantitative and descriptive findings from the 1998 survey of the GRT program. The major purpose of this analysis is to provide information useful for project monitoring and evaluation, and for measuring achievement of NSF's GPRA Outcome Goal Number Three.

GRT Distance Monitoring Survey

The GRT Distance Monitoring Survey was initiated in 1997 to collect annual quantitative and qualitative data about the projects via the World Wide Web. Projects annually report information about personnel (including trainee characteristics and achievements), project features (such as recruitment strategies), and institutional impact. In 1997, GRT projects reported activities and accomplishments dating from the first year in which NSF funding was received through June 1997. The 1997 data collection provided a comprehensive snapshot of the program from 1992 to 1997.[3] Thus, in 1998, the second survey, GRT projects reported information about activities for just one academic year. This reporting of annual data initiated the possibility of conducting analyses examining how the GRT program is evolving on a year-to-year basis.

The 1998 survey requested clarification on several previously collected data items in order to facilitate quantitative and trend analysis. For example, data on specific GRT project features, such as multidisciplinary training, were collected in a simple "yes/no" check-off format in the 1997 survey. In 1998, for each project feature, the survey presented a detailed checklist of specific approaches that might have been used, along with places to indicate whether such activities predated and/or were developed with the NSF funding. Due to such slight differences between the two reporting years, some items in this brief are being reported for the first time as baseline, rather than trend, data. These few instances of new baseline data are clearly indicated by table titles and textual explanations.

[3] Those data are summarized in the Westat study *Monitoring the Graduate Research Traineeship Program: Baseline Report* (September 1998).

2. IMPLEMENTATION OF THE GRT PROGRAM

Participation in GRT Program

Many of the tables in this brief reflect the four cohorts of GRT proposals that were approved in 1992, 1993, 1994, and 1995. The 1992 cohort projects received standard grants, i.e., all 5 years of funding were provided at the time of award, while cohorts after 1992 received funding through continuing grants, i.e., incremental funding. Participating graduate students receive GRT traineeship support from a funded project, but trainee participation does not usually coincide with all the years for which a particular project is funded. The 1995 cohort was the last group of projects to be implemented under the GRT program; GRT has been succeeded by the Integrative Graduate Education and Research Training (IGERT) program, which made its first awards in 1998.

By FY 1996, the GRT program had made 157 awards to 92 postsecondary institutions. These 157 projects in turn had provided traineeships to 1,595 doctoral students by the end of the 1998 reporting period, an increase of 284 from the 1,311 trainees reported in the 1997 data (Table 1). This increase in the total number of trainees who were ever funded by GRT resulted largely from the replacement of the 280 trainees who had left their Ph.D. programs with newly funded trainees.

Table 1
Number of GRT project awards, institutions receiving awards, and trainees supported, by award cohort: 1998 reporting year

Award recipient	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
Project awards	38	48	33	38	157
Institutions receiving awards	30	44	31	37	92[1]
Total trainees supported as of 1997	385	439	259	228	1,311
Total trainees supported as of 1998	449	527	320	299	1,595

[1]Number of institutions may vary slightly depending on method used for specifying separate entities. The total number of institutions receiving awards as of the 1998 reporting year is an unduplicated count. The sum of institutions receiving awards in each award year does not equal 92 because institutions may receive disciplinary-distinct awards in more than one year.

SOURCE: GRT Distance Monitoring Survey System. Surveys completed in 1997 and 1998.

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Awards are categorized into broad focus areas that reflect the seven NSF directorates supporting the SMET initiatives. Many of the analyses in this paper are organized into these broad focus areas. The number of GRT awards in each broad focus area and cohort is shown in Table 2.

Table 2
GRT project awards by broad focus area, by cohort year: 1992-95

Broad focus area	Award cohort				1992-95
	1992	1993	1994	1995	
Total project awards.....	38	48	33	38	157
Biological Sciences (BIO)	8	14	4	8	34
Computer and Information Sciences and Engineering (CISE).....	1	6	4	3	14
Education and Human Resources (EHR)	0	1	3	5	9
Engineering (ENG).....	10	11	6	10	37
Geosciences (GEO)	2	5	7	3	17
Mathematical and Physical Sciences (MPS).....	11	8	4	6	29
Social, Behavioral, and Economic Sciences (SBE)	6	3	5	3	17

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

GRT Principal Investigator and Advisor Characteristics

Since the inception of the GRT program in 1992, 176 individuals have served as principal investigators (PIs) and 845 as GRT advisors. PI and advisor characteristics for all cohorts as reported in 1997 and 1998 are shown in Table 3 (and by cohort year in Appendix Table A-1). The data indicate that in both the 1997 and 1998 reporting years, 17-18 percent of PIs were female and 6 percent were minorities, while 14 percent of the advisors were female, and 5 percent were minorities.

Table 3
Characteristics of GRT principal investigators and advisors: Reporting years 1997 and 1998

Principal investigator and advisor characteristic	All cohorts: 1997	All cohorts: 1998
Total principal investigators	157	176
Gender		
Male	82.2%	81.8%
Female	17.8	17.0
Minority status[1]		
Minority	5.7	5.7
Nonminority	92.4	92.0
Disability status		
Disabled	0.6	0.6
Not disabled	98.1	97.2
Citizenship		
U.S. citizen	92.4	90.3
Permanent resident	7.6	8.5
Total advisors	733	845
Gender		
Male	84.3%	82.5%
Female	13.8	14.1
Minority status[1]		
Minority	4.5	5.0
Nonminority	86.8	85.4
Disability status		
Disabled	1.0	0.9
Not disabled	84.2	85.0
Citizenship		
U.S. citizen	86.1	83.8
Permanent resident	9.4	9.8

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander, or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

NOTE: Percents may not add to 100 because of rounding and/or data items not reported.

SOURCE: GRT Distance Monitoring Survey System. Surveys completed in 1997 and 1998.

GRT Trainee Characteristics

The GRT program emphasized increased participation in integrative research and education experiences by persons with disabilities, women, and individuals from groups that are underrepresented in SMET studies generally and in related technical and teaching careers. In 1998, 37 percent of the 1,595 trainees who had been provided financial support were female and 11 percent were minorities (Table 4). Percentages of female and minority trainees were similar in both reporting periods.[4]

The data showing trainee characteristics by award cohort suggest that efforts to recruit minority students into the GRT program were slightly more successful for the 1993 and 1994 cohorts (Appendix Table A-2). The percentage of minority trainees rose from about 9 percent in the 1992 cohort to 12 percent in the 1993 cohort and 16 percent in the 1994 cohort, dropping again to 9 percent for the 1995 cohort. Projects reported that overall, just 1 percent of trainees were disabled, which was the case across all cohorts. However, for 18 percent of trainees, disability status was not reported. Nearly 90 percent of GRT trainees were U.S. citizens; another 5 percent were permanent residents.

GRT trainee characteristics by broad focus show that the highest representation of women trainees was in Education and Human Resources (46 percent) and Biological Sciences (45 percent), while the lowest was in Computer and Information Sciences and Engineering (21 percent). The largest representation of black trainees but the lowest of Hispanics was in Computer and Information Sciences and Engineering (12 and 2 percent, respectively). Trainees who were reported as disabled comprised 2 percent of trainees in each of three areas: Computer and Information Sciences and Engineering, Education and Human Resources, and Mathematical and Physical Sciences; Engineering reported no disabled trainees. These data, as well as citizenship status by cohort and broad focus area are presented in Appendix Tables A-3 through A-7.

[4] In comparing GRT data for 1997 and 1998, the high rates (9.7 percent and 9.0 percent, respectively) at which race/ethnicity was not reported should be kept in mind.

Table 4
Characteristics of GRT trainees: Reporting years 1997 and 1998

Trainee characteristic	All cohorts: 1997	All cohorts: 1998
Total trainees	1,311	1,595
Gender		
Male	61.6%	61.8%
Female	37.5	36.8
Race/ethnicity		
White	70.8	72.7
Black	7.2	6.8
Hispanic	3.4	3.3
Asian	7.6	7.1
Pacific Islander	0.5	0.4
American Indian/ Alaskan Native	0.9	0.8
Not reported	9.7	9.0
Minority status[1]		
Minority	11.9	11.2
Nonminority	78.4	79.7
Not reported	9.7	9.0
Disability status		
Disabled	1.3	1.0
Not disabled	78.5	81.4
Not reported	20.2	17.6
Citizenship		
U.S. citizen	89.9	89.8
Permanent resident	4.3	4.7

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander, or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

NOTE: Percents may not add to 100 because of rounding and/or data items not reported or missing.

SOURCE: GRT Distance Monitoring Survey System. Surveys completed in 1997 and 1998.

Gender. In Table 5, comparison of GRT data from reporting year 1998 with those from NSF's biennial Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS) for 1995 and 1997 shows that the percentage of women participating in the GRT program (37 percent) was lower than the percentage of all women graduate students in science and engineering in both 1995 and 1997 (41 and 43 percent, respectively).

Table 5
Comparisons of GRT trainee participation with national graduate student enrollment, by gender

Survey	Total	Male	Female
NSF GRT Monitoring System			
1998 reporting year.....	1,572	62.7%	37.3%
NSF Survey of Graduate Students and Postdoctorates in Science and Engineering			
1995, science and engineering fields	325,135	58.6	41.4
1997, science and engineering fields	308,835	56.7	43.3

NOTE: For comparability, GRT data on trainees for whom gender was unknown were not included in this table. Since GSS race/ethnicity data are available only for U.S. citizens and permanent residents, percentages are calculated using only data for citizens and permanent residents. The 1995 GSS data in this table should be used as the new baseline to compare GRT data to national trends, rather than the GSS data in Table 3-2 of the GRT baseline report.

SOURCE: GRT Distance Monitoring Survey Systems, reporting year 1998, and special tabulations of the National Science Foundation 1995 and 1997 Surveys of Graduate Students and Postdoctorates.

As shown in Appendix Table A-8, female GRT trainees in two broad focus areas exceeded the national rate for female graduate students: 8 percent more in Engineering, and 5 percent more in Geosciences. On the other hand, nationally, women in Biological Sciences, Computer and Information Sciences and Engineering, and Social, Behavioral, and Economic Sciences, composed, respectively, 3, 5, and 15 percent more of the graduate student population than they did of GRT trainees in those fields.

Race/Ethnicity. Comparison of GRT data on race/ethnicity of trainees from reporting year 1998 with those from the GSS survey for 1995 and 1997 show that the percentages of trainees in each group were very close to those reported by the GSS survey (see Table 6). In comparing GRT and GSS data, however, the high rates at which race/ethnicity was unreported or not known (9 percent for GRT and 6 percent for GSS) should be kept in mind.

Asians are not one of the underrepresented groups identified for GRT. In order to mirror the categories in which student data are collected by GSS, it is necessary to combine Asian and Pacific Islander data for GRT trainees. This combination makes it impossible to use GSS data as a baseline for assessing the GRT program's progress in promoting involvement of Pacific Islanders in SMET. These data are shown by broad focus area in Table A-9.

Table 6
Comparisons of GRT trainee participation with national graduate student enrollment, by race/ethnicity

Survey	Total	Race/ethnicity					
		White	Black	Hispanic	Asian/ Pacific Islander	American Indian/ Alaskan Native	Not reported
NSF GRT Monitoring System							
1998 reporting year	1,595	72.7%	6.8%	3.3%	7.5%	0.8%	9.0%
NSF Survey of Graduate Students and Postdoctorates in Science and Engineering							
1995, science and engineering fields	325,135	75.9	5.6	4.3	8.0	0.5	5.6
1997, science and engineering fields	308,835	73.8	6.3	4.9	8.4	0.5	6.1

NOTE: For comparability, GRT data on trainees for whom gender was unknown were not included in this table. Since GSS racial/ethnic data are available only for U.S. citizens and permanent residents, percentage are calculated using only data for citizens and permanent residents. The GSS data on race/ethnicity for 1995 presented in Table 3-4 of the GRT baseline report mistakenly excluded data on female students; therefore the 1995 GSS data above should be used as the new baseline to compare GRT data to national trends. Percents may not add to 100 because of rounding.

SOURCE: GRT Distance Monitoring Survey Systems, reporting year 1998, and special tabulations of the National Science Foundation 1995 and 1997 Surveys of Graduate Students and Postdoctorates.

3. Strategies Used to Recruit GRT Trainees and Enhance Their Educational Experiences

GRT Recruitment Strategies

Prior to 1998, the Distance Monitoring System did not collect quantitative data about specific recruiting strategies. However, programs did provide narrative data about recruitment in 1997, permitting limited comparisons between the 1997 narrative data and the 1998 quantitative data.

Overall, the 1998 data indicate that 90 percent of the GRT projects used one or more strategies to recruit trainees for the GRT program (Appendix Table A-10). Only the 1992 award cohort had fewer than 90 percent of its projects (79 percent) reporting one or more GRT recruitment strategies. The most frequently reported recruitment strategies included:

- Developing brochures, posters, and other program announcements about GRT (73 percent);
- Recruiting undergraduate and graduate students already enrolled at the GRT institution (53 percent);
- Using GRT funds to bring prospective GRT trainees to campus (53 percent);
- Posting GRT advertisements in scholarly publications, web pages, electronic bulletin boards, and e-mail lists (50 percent);
- Promoting GRT project at national meetings and/or graduate student fairs (43 percent); and
- Visiting predominately undergraduate institutions (28 percent).

Comparison of the 1997 narrative data and 1998 quantitative data suggests that more programs were using each of these strategies in 1998 than they were in 1997.[5] For example, the Baseline Report indicated that in 1997, less than half of projects used brochures, posters, and other program announcements. About one-third reported using advertisements in scholarly publications, web pages, electronic bulletin boards, and e-mail lists in 1997, and only 10 percent used GRT funds to bring prospective trainees to visit the program.

During the 1998 data collection period, projects were asked whether each strategy was developed by GRT (as opposed to already being in use by the department or institution). In response, the majority (generally two-thirds or more) reported the strategies were developed by the GRT project. Over 80 percent of those projects that placed ads in scholarly journals or electronic media and promoted GRT at national meetings and/or graduate student fairs reported that these strategies had been developed as a result of GRT.

Recruitment of Individuals from Underrepresented Groups. The 1998 data indicated that 38 percent of all GRT projects reported visiting minority-serving institutions or women's colleges to recruit minority and female trainees (Appendix Table A-10). Fifty percent made some other effort to recruit individuals from these underrepresented populations. This figure represents an increase from the 1997 reporting period; the Baseline Report indicated that about 41 percent of the projects reported making some special effort to recruit female, minority, and/or disabled trainees.[6]

In addition to the quantitative data in the 1998 Distance Monitoring System, projects provided detailed textual information about their efforts to recruit underrepresented groups for GRT traineeships.

These qualitative data indicate that the majority had developed new strategies to recruit individuals from underrepresented groups, while simultaneously using preexisting university or departmental

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[5] Note that the 1997 data do not provide sufficient detail to decipher whether these approaches were developed specifically for the GRT project or were part of a larger recruitment strategy already in use by the department and/or institution.

[6] During the 1997 data collection, projects were not presented with specific check-off items in the survey on whether their recruitment included special emphases on female and/or minority students. Since this information was specifically listed in the 1998 reporting year, a higher percentage of projects may have made special efforts to recruit underrepresented populations.

channels to recruit these persons. The most frequently cited strategies included:

- Sending promotional mailings (including e-mail) to institutions with high minority enrollment, or to mailing lists (e-mail and postal) of minority students;
- Contacting and visiting faculty and students at women's colleges and historically black colleges and universities;
- Recruiting minority and female undergraduates or graduate students enrolled in the same department in their own universities; and
- Promoting GRT at national meetings and conferences, in advertisements in professional publications, and through national societies for women and/or minorities in the sciences.

Three projects reported establishing "pipeline" programs that link minority undergraduates to their doctoral programs. One such project is developing a "feeder school" program that will eventually include faculty exchanges for lectures, seminars, and workshops, cooperative research projects and instructional activities, sharing of research facilities, and linking GRT trainees and prospective students by electronic mentoring and "virtual" supervision of undergraduate research projects.

Using the Internet for Recruitment. Projects provided supporting text data about recruitment strategies using the Internet in the 1998 Distance Monitoring System.[7] Analysis of these data indicates that the Internet is a popular recruitment tool. The most common uses of the Internet were advertising the GRT traineeships on web sites, electronic bulletin boards, listserves, and newsgroups. Many projects used their university or departmental web site to provide detailed information about their GRT traineeships as well as research activities, faculty, and coursework. Two projects reported that their GRT trainees are responsible for developing web sites for their programs. One of those projects, at a public university, asked their trainees to maintain portfolios of their progress through the entire year and to develop those portfolios into web pages. This project plans to link these web-based portfolios to the department web site as a means of conveying to prospective students what sorts of activities and opportunities might be available to them.

[7] During the 1997 data collection, projects were not specifically asked to address whether their recruitment strategies used the Internet.

GRT Project Features

One of the GRT program's objectives is to "stimulate the development of graduate training environments that simultaneously address areas of national science and technology priority and proactively build an infrastructure capable of promoting and sustaining student diversity" (NSF GRT 1995 Program Announcement, NSF 94-140).

The 1998 data[8] indicate that GRT grantees have made considerable efforts to increase their offerings of innovative educational experiences for their trainees. Table 7 shows the percentage of projects reporting specific project features in the 1997 and 1998 reporting periods. The data also indicate a trend in which these project features were provided by more projects over time. Thus, in each subsequent award year, GRT projects have increased the range of educational experiences made available to their students in order to supplement the more typical research opportunities traditionally afforded by most NSF grant funding. Appendix Table A-11 presents these data by award cohort, providing details about specific activities undertaken, as well as the percentage of those activities developed by GRT.

The quantitative 1997 data on project features are limited to the percentage of projects reporting use of specific features. A higher percentage of projects reported international opportunities and initiatives to prepare trainees for faculty positions in the 1998 reporting period than did so in 1997 (Table 7). However, multidisciplinary training activities were offered by a slightly higher percentage of projects in the 1997 reporting period than in the 1998 reporting period.

[8] Much more detailed data were collected for the 1998 reporting period than for previous years, limiting comparisons between the Baseline Report and this report. Previous data only indicated whether or not the following project features were offered: multidisciplinary training activities; industry cost-sharing of trainees; international opportunities for trainees; preparing trainees for faculty positions by providing training in effective teaching methods, advanced technology, or advising and mentoring students; and other structural components. A text box was also available for entering descriptions of the project features, but such descriptions could not be easily tabulated.

Table 7
GRT projects reporting specific features: Reporting years 1997 and 1998

Project feature	All cohorts: 1997	All cohorts: 1998
Multidisciplinary training activities	93.6%	89.8%
Private/public sector opportunities for trainees	NA	66.2
International opportunities for trainees	37.6	58.6
Initiatives to prepare trainees for faculty positions	54.1	85.4
Other structural components	NA	49.0

NA = not available.

SOURCE: GRT Distance Monitoring Survey System. Surveys completed in 1997 and 1998.

Multidisciplinary Training Activities. The 1998 data indicate that 90 percent of projects reported developing multidisciplinary arrangements with other academic departments, and considerably more than half of all project features in this category were developed subsequent to receiving GRT funding (Appendix Table A-11). The percentage of projects reporting these activities increased with each successive cohort, from 74 percent of projects in the 1992 cohort to 100 percent in the 1995 cohort. The most common multidisciplinary training activities included:

- Providing instruction and other academic support by faculty from multiple departments (73 percent overall);
- Offering multidisciplinary courses (66 percent overall); and
- Providing traineeships to students from various departments (54 percent overall).

Analysis of text data provided by GRT projects indicates that the projects strongly support the goal of multidisciplinary training and have developed training features to achieve that goal for their students. In addition to those activities listed above, many departments described activities such as lab rotations or research projects in other departments, multidisciplinary field projects and seminars, and interdisciplinary advising and thesis committees.

Private/Public Sector Opportunities. Overall, about 66 percent of projects reported in 1998 that they had offered private/public sector opportunities to their trainees, and more than half of these opportunities were developed by GRT. Again, an increasing percentage of grantees developed these activities in each

successive cohort. Half of the 1992 cohort offered such opportunities, compared to three-quarters in the 1995 cohort (Appendix Table A-11). The most common private/public sector opportunities included:

- Educational or research advisors/collaborators from industry/private/nonprofit/public sectors (40 percent overall); and
- Internships in industry/private/nonprofit/public sectors (36 percent overall).

Projects offered a myriad of other opportunities for trainees to gain exposure to and experience with employment options in their field. In addition to internships, some programs encouraged students to work for or under contract to industrial and/or government laboratory researchers during their traineeships. Others had affiliated faculty from industry as partners. Several projects developed special training, workshops, or colloquia with industry partners. For example, one project described an Applied Mathematics in Industry Workshop in which industrial researchers presented problems, then faculty, postdoctoral, and student teams worked for a week to develop solutions. At the end, trainees made oral presentations and wrote papers about the problem and potential solutions.

International Opportunities. Overall, 59 percent of the projects reported in 1998 that they had used international activities to enhance their trainees' educational experiences (Appendix Table A-11). Projects appear to be placing increased emphasis on offering such opportunities; only 38 percent of projects reported them in the 1997 reporting year. As with the other project features, the percentage of projects that reported having offered these opportunities was higher for each successive cohort. Common activities included:

- Travel to foreign meetings/conferences (38 percent overall);
- Work in foreign universities/research settings (27 percent overall); and
- Field research in conjunction with foreign researchers (21 percent overall).

One example of the type of rich opportunities GRT projects offered their trainees was a research trip to Costa Rico for students to learn about conservation and biodiversity in the tropics, the most species

rich environments in the world; to see how human activities such as urbanization, farming, and logging are affecting habitats, biodiversity, and ecosystem processes; and to introduce them to people and projects engaged in exemplary conservation projects. After initial visits to a variety of sites in the country, students and faculty split into a marine and a terrestrial team, each of which undertook a research project.

Initiatives to Prepare Trainees for Faculty Positions. Overall, 85 percent of projects reported initiatives to prepare trainees for faculty positions in 1998, compared to 54 percent in 1997. The 1994 and 1995 cohorts placed considerable emphasis on these activities; over 97 percent of those grantees engaged in such activities (Appendix Table A-11). It appears, however, that many grantees offered these activities before GRT funding; for most activities, less than 50 percent were developed by GRT. The most common activities included:

- Trainees serving as teaching assistants or mentors to students (69 percent overall);
- Trainees receiving instruction in effective teaching methods (44 percent overall);
- Trainees participating in teaching exercises (41 percent overall); and
- Trainees developing course or curriculum materials (30 percent overall).

Other Structural Components. Overall, nearly half of the projects reported in 1998 that they had offered "other structural components" to enhance their trainees' educational experiences (Appendix Table A-11). These components varied widely, including experiences such as colloquia, workshops, weekly research meetings, and weekend or summer laboratory courses.

Consortial Agreements. Consortial arrangements are formal alliances between a GRT project and at least one other organization designed to help GRT projects achieve objectives (e.g., recruit minority students, provide graduate students with training in a specific field) that might otherwise not be accomplished. For the 1998 reporting year, 43 percent of the projects overall reported at least one consortial agreement (Table 8), slightly higher than the 40 percent of projects that reported such agreements in 1997 for the 1992-97 period. The percentage of projects that reported having

established consortial agreements with other graduate-degree-granting institutions in order to provide trainees opportunities to engage in special research and training at other institutions was higher in 1998 than in 1997. However, a smaller percentage reported minority consortial agreements (to recruit underrepresented minorities) and nongraduate consortial agreements (in which nongraduate institutions serve as feeder schools for a GRT project) than had reported having such arrangements in 1997. Appendix Table A-12 presents data on consortial agreements by award cohort.

Table 8
GRT projects reporting consortial agreements: Reporting years 1997 and 1998

Consortial agreement	All cohorts: 1997	All cohorts: 1998
Total number of project awards	157	157
Projects reporting at least one consortial agreement[1]	40.1%	42.7%
Nongraduate consortial agreements[2]	20.4	17.2
Graduate consortial agreements[3]	14.6	22.9
Minority consortial agreements[4]	32.5	24.8

[1]Combinations or groups formed to undertake an enterprise beyond the resources of any one member.

[2]Nongraduate institution serves as a feeder school for a GRT project by identifying students for recruiting purposes.

[3]Consortial arrangements with another graduate-degree-granting institution. Under this arrangement trainees might be provided opportunities to engage in special research and training at lower institutions.

[4]Arrangements that are specifically designed to increase the pool of minority trainees at GRT projects.

SOURCE: GRT Distance Monitoring Survey System. Surveys completed in 1997 and 1998.

4. GRT PROGRAM OUTCOMES

Two types of GRT program outcomes were examined for this chapter: GRT trainee outcomes and GRT project/institutional outcomes. Trainee outcomes tracked by the Distance Monitoring System include trainee achievements, trainee Ph.D. completion, years required to complete Ph.D., employment status of trainees who completed Ph.D.s., trainee attrition and the reason for attrition, and employment status of trainees who left GRT program prior to Ph.D. completion. GRT project/institutional outcomes recorded in the System include course features developed by or resulting from the GRT project.

GRT Trainee Outcomes

Trainee Achievements. Projects reported in 1998 that about 55 percent of GRT trainees had at least one academic achievement during their years in the GRT program (Appendix Table A-13), essentially the same as the 56 percent for 1997 in the Baseline Report. The most common achievements were presentations and journal articles; very few trainees had patents, books, or book chapters. The percentage of trainees who had at least one achievement increased from 45 percent for the 1992 cohort to 71 percent for the 1995 cohort. This increase, however, may be partly attributable to the difficulty of obtaining citations on achievements from the earlier years of the projects for entry into the monitoring system during the 1997 reporting year. The average number of achievements per trainee in 1998 was 2.2. The average number of achievements per trainee varied considerably by broad focus area. Trainees in Education and Human Resources had the highest number of achievements per trainee (5.0), followed by Biological Sciences (2.5), and Engineering (2.1).

Trainee Ph.D. Completion. By 1998, the cumulative percentage of GRT trainees who had completed their Ph.D.s (Table 9) was about 12 percent, almost double the cumulative completion rate by 1997 reported in the Baseline Report. As expected, Ph.D. completion rates decreased for each cohort, from 23 percent of trainees in the 1992 award cohort to 5 percent of trainees in the 1995 award cohort (Appendix Table A-14). Overall, cumulative completion rates in 1998 were similar for male and female trainees (13 percent and 12 percent, respectively), while in 1997, the completion rate for females was about 5 percent compared to 7 percent for males. By 1998, the cumulative percentage of minority

trainees who had completed their degrees by 1998 was only 4 percent, compared to 13 percent of nonminorities, a difference of 9 percent. In 1997, the difference between the cumulative completion rates for these two groups was only 5 percent.

Completion rates also varied by broad focus area. They were highest among trainees in Mathematical and Physical Sciences (17 percent) and Biological Sciences (14 percent), and lowest for trainees enrolled in Engineering (8 percent) and Social, Behavioral, and Economic Sciences (7 percent) programs.

Table 9
GRT trainee Ph.D. completion: Reporting years 1997 and 1998

Trainee characteristic	All cohorts: 1997	All cohorts: 1998
Total trainees who completed Ph.D.	86	194
Percentage of trainees who completed Ph.D.	6.5%	12.2%
Gender		
Male	7.4	12.6
Female	4.9	11.6
Minority status[1]		
Minority	1.9	3.9
Nonminority	6.7	12.9
Disability status		
Disabled	NA	12.5
Not disabled	NA	12.2
Broad focus area		
Biological Sciences (BIO)	9.1	14.0
Computer and Information Sciences and Engineering (CISE)	8.9	11.7
Education and Human Resources (EHR)	1.6	12.0
Engineering (ENG)	1.8	7.6
Geosciences (GEO)	10.6	13.8
Mathematical and Physical Sciences (MPS)	7.7	16.9
Social, Behavioral, and Economic Sciences (SBE)	4.8	6.6

NA = not available.

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

SOURCE: GRT Distance Monitoring Survey System. Surveys completed in 1997 and 1998.

Years Required to Complete Ph.D. The 1998 cumulative data show that the average time required to complete a Ph.D. (5.5 years) did not vary by gender or minority status (Appendix Table A-15). However, disabled trainees took longer to graduate than did nondisabled trainees, and trainees enrolled in Education and Human Resources and Social, Behavioral, and Economic Sciences programs took longer to graduate than trainees in other fields of study.

Overall, the number of years required for GRT trainees to complete their Ph.D.s[9] has decreased since the 1997 reporting year (Table 10). Appendix Tables A-16 through A-18 present the cumulative number of years required for GRT trainees to complete the GRT Ph.D. by cohort overall, by gender and minority status, and by broad focus area.

Table 10
Years required for GRT trainees to complete Ph.D.: Reporting years 1997 and 1998

Years to complete Ph.D.	All cohorts: 1997	All cohorts: 1998
Total trainees who completed Ph.D.	86	194
Years to complete Ph.D.		
3 years or less	1.9%	8.2%
4 years	9.6	12.9
5 years	44.6	25.3
6 years	34.4	28.9
7 or more years	3.2	19.1

NOTE: Percents may not add to 100 because of rounding and/or data not reported or missing.
SOURCE: GRT Distance Monitoring Survey System. Surveys completed in 1997 and 1998.

Employment Status of Trainees Who Completed Ph.D.s. Appendix Tables A-19 through A-21 show cumulative 1998 data on employment status of GRT trainees who completed their Ph.D.s, by award cohort overall, by gender and minority status, and by broad focus area. The data indicate that almost half of the 194 trainees who completed their GRT Ph.D.s by the 1998 reporting year were in postdoctoral positions. Most of the others were employed as educators (19 percent) or by private organizations (22

[9] The average time that students receive GRT funding (15.7 months) is less than the number of years required to complete a Ph.D. (1997 GRT survey data).

percent). These data were not collected quantitatively in 1997, so comparisons between the reporting years are not possible.

Postgraduate employment status did not vary by gender. It did, however, vary by minority status. Minority graduates were more likely to be employed in education or government than were nonminority graduates, but they held no positions in private or other employment. Employment status of GRT graduates also varied by broad focus area. In reporting year 1998, 60 percent of Social, Behavioral, and Economic Sciences graduates were employed in education, compared to 12 percent each of Engineering and Geosciences graduates (Appendix Table A-21). Nearly 77 percent of Biological Sciences graduates were in postdoctoral positions, compared to 31 percent of Engineering graduates. The largest proportion of Engineering graduates were working in private employment (50 percent); in contrast, only 4 percent of Biological Sciences graduates were privately employed.

Trainee Attrition. By 1998, the cumulative percentage of all trainees who discontinued their participation in GRT before attaining a Ph.D. was 18 percent, compared to a cumulative 10 percent in 1997 (Table 11). Attrition rates increased in all broad focus areas, even doubling in Computer and Information Sciences and Engineering, Engineering, and Geosciences. Both the 1997 and 1998 cumulative data indicate that male and female trainees discontinued their GRT study at about the same rate, but minority trainees had a higher attrition rate than nonminority trainees—overall, 24 percent for minority trainees and 17 percent for nonminority trainees. Attrition rates were also higher for disabled trainees in the 1998 data (25 percent) than for nondisabled trainees (17 percent). The total number of disabled trainees, 16, was very low, however, so these percentages should be viewed from that perspective.

Table 11
GRT trainee attrition prior to Ph.D. completion: Reporting years 1997 and 1998

Trainee characteristic	All cohorts: 1997	All cohorts: 1998
Total trainees who terminated Ph.D.	126	280
Percentage of trainees who terminated Ph.D.	9.6%	17.5%
Gender		
Male	9.7	17.1
Female	9.8	18.7
Minority status[1]		
Minority	14.7	23.5
Nonminority	9.2	16.8
Disability status		
Disabled	NA	25.0
Not disabled	NA	16.6
Broad focus area		
Biological Sciences (BIO)	5.4	10.5
Computer and Information Sciences and Engineering (CISE)	13.3	23.4
Education and Human Resources (EHR)	4.8	6.0
Engineering (ENG)	14.5	29.1
Geosciences (GEO)	4.2	10.6
Mathematical and Physical Sciences (MPS)	12.3	19.5
Social, Behavioral, and Economic Sciences (SBE)	8.6	16.4

NA = not available.

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

SOURCE: GRT Distance Monitoring Survey System. Surveys completed in 1997 and 1998.

Reasons for Attrition. Appendix Table A-22 presents cumulative attrition data by award cohort, and Appendix Tables A-23 through A-25 show reasons for attrition by overall award cohort, gender and minority status, and broad focus area. These data help explain certain attrition trends. For example, 22 percent of the 1993 cohort stopped their pursuit of the GRT Ph.D. About 54 percent of the trainees in that cohort who left did so to pursue employment. In that cohort, there were seven projects in Human Computer Interface or Robotics, nine in Engineering, five in Hydrology, and

eight in Mathematical and Physical Sciences' integrative high-performance computing or environmental areas. In all of these fields, industry employment may be a more lucrative option than academic positions, perhaps explaining the high attrition rate.[10]

Analysis of attrition data by broad focus area also supports the theory that attrition rates may correspond with lucrative employment options in certain fields. In both the 1997 and 1998 cumulative data sets, attrition rates were higher than the overall GRT program average in the fields making up Engineering, Mathematical and Physical Sciences, and Computer and Information Science and Engineering graduate study. The 1998 data showed that the most common reason overall for trainees to leave the GRT program was to pursue employment (45 percent) (Appendix Table A-23). More than half of the Engineering and Computer and Information Science and Engineering trainees who left the GRT program did so to pursue employment (Appendix Table A-25).

Overall, men were more likely than women to leave the program to pursue employment (although that was not the case in every cohort). Similarly, nonminorities were more likely than minorities to leave to pursue employment overall, but not in every cohort (Appendix Table A-24).

The cumulative 1998 data indicate that the second most common reason for leaving the GRT program was to pursue other academic interests (27 percent). This reason was given by roughly equivalent percentages of men and women and of minorities and nonminorities. However, this reason varied greatly according to broad focus area; 80 percent of Education and Human Resources trainees who left the program did so for this reason, while only 12 percent of Social, Behavioral, and Economic Sciences trainees who left did so for that reason (Appendix Table A-25).

Very few (about 8 percent) trainees left the program due to family or economic problems. Women were twice as likely as men to leave for family or economic problems, and nonminorities were slightly more likely than minorities to leave for that reason. Overall, only 6 percent of trainees left because they failed to meet program requirements. However, minorities were more likely than nonminorities to fail to meet requirements (14 percent compared to 5 percent).

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[10] Staff of the Engineering Directorate's Engineering Workforce Commission state that in the engineering field, persons whose highest degree is a master's (sometimes in combination with another type of graduate degree) are very likely to obtain extremely interesting employment opportunities.

Employment Status of Trainees Who Left GRT Program Prior to Ph.D. Completion. Employment data for trainees who left the GRT program before Ph.D. completion were collected as text in 1997, so comparisons between the baseline and 1998 data are not feasible. The cumulative 1998 data showed that trainees who had left the GRT program prior to completing their degree were most likely to be employed in the private sector (39 percent) (Appendix Table A-26). Employment status was unknown for another 19 percent of former trainees. The other former trainees were in school either at the GRT institution or elsewhere, or employed in the public sector or an academic setting.

Appendix Tables A-27 and A-28 show employment status of former trainees by gender and minority status and by broad focus area. Males were more likely than females to be employed in the private sector, while females were more likely to be employed in the public sector. Females were also more likely than males to be enrolled in another graduate program at the GRT institution. The number of minority trainees who left the GRT program is very small (ranging from 7 to 16 over the various cohorts), so comparisons between minority and nonminority trainees in these tables should be made in light of this fact.

Former trainees enrolled in Computer and Information Science and Engineering, Engineering, and Social, Behavioral, and Economic Sciences were more likely than former trainees in the other broad focus areas to be employed in the private sector. Small numbers of former trainees in other employment or educational settings prohibit other comparisons between broad focus areas.

GRT Project/ Institutional Outcomes

GRT Course Features. Projects provided information about "institutional impact," defined in the Distance Monitoring System as "those course and/or curriculum accomplishments that will remain with a department after the GRT project has ended." Table 12 provides an overview of new course features attributable to GRT; Appendix Table A-29 presents those data by award cohort. As of the 1997 reporting year, 249 new courses had been developed by all projects from the start of their implementation. During the 1998 reporting year, those projects added another 79 new courses. The projects instituted 145 new requirements for trainees to complete in order to earn a doctorate as of the 1997 reporting year; they added another 42 during the 1998 reporting year. Projects reported 140 new interdepartmental offerings in the 1997 data, and an additional 35 in the 1998 data. Finally, they reported 527 seminars, workshops, and conferences in 1997, and another 130 in 1998.

Table 12
Number of GRT course features: Reporting years 1997 and 1998

Course feature[1]	Implemented 1992-97	Implemented 1998 reporting year
Total number of project awards...	157	157
New courses[2] developed by GRT project	249	79
New requirements[3] resulting from GRT project	145	42
New interdepartmental offerings[4] resulting from GRT project	140	35
Seminars, workshops, conferences resulting from GRT project	527	130
Other	NA	30
Total new GRT course features....	1,061	316

NA = not available.

[1]Projects may report multiple new course features. Numbers reflect counts of new course features, rather than counts of projects reporting new course features.

[2]The number of new course requirements developed by a department to serve the primary GRT subfocus area.

[3]The number of new requirements developed by a department for a trainee to complete a doctorate in the primary GRT subfocus area.

[4]The number of interdepartmental courses developed to serve the primary GRT subfocus area.

SOURCE: GRT Distance Monitoring Survey System. Surveys completed in 1997 and 1998.

Overall, 28 percent of projects reported developing one or more new courses during the 1998 reporting year (Appendix Table A-30). The percentages of projects that reported at least one new GRT course feature was lowest for the 1992 cohort projects, higher for each of the next two cohorts, then slightly lower for the 1995 cohort. In addition, during the 1998 reporting year, 9 percent of projects had added new course requirements, 17 percent added new interdepartmental offerings, and 39 percent added at least one seminar, workshop, and/or conference resulting from their GRT award.

5. CONCLUSION

Analysis of GRT data for the 1998 reporting year entailed preparation of some tables comparable to those reported in the 1997 baseline GRT report. Other tables were developed to present data not previously collected or examined. Further, detailed text responses from the project reports were reviewed to provide additional contextual information to supplement the quantitative data. Below are brief descriptions of some of the findings that resulted from the analyses of the 1998 GRT report.

Summary of Findings

Enrollment. Minority enrollment in the GRT program was stable, decreasing only slightly, from 12 to 11 percent, between the 1997 and 1998 reporting years. Between those same years, the percentage of female trainees also decreased only slightly, from 38 to 37 percent. The percentage of disabled trainees in those two reporting years remained the same, at 1 percent. The 1994 cohort had the highest percentage of minority trainees, at about 16 percent.

Comparison of GRT Enrollment to National Graduate Enrollment. Comparison of data from the GRT Distance Monitoring Survey System with those from NSF's GSS for 1997 shows that the percentage of women participating in the GRT program (37 percent) was lower than the percentage of women graduate students in science and engineering overall in the country (43 percent).

Comparison of data on race/ethnicity data from the same sources shows that the overall rates of participation of GRT trainees by race/ethnicity group were very close to the percentages reported by the GSS for those same ethnic groups, varying by no more than 2 percent. These data are less precise, however, than the comparisons of data on gender because of the high percentages in both data sources for which race/ethnicity was unknown.

Recruitment. Most of the GRT projects (90 percent) used at least one strategy to recruit trainees for the GRT program. About 38 percent reported visiting minority-serving institutions or women's colleges to recruit minority and female trainees; 50 percent made

some other effort to recruit trainees from underrepresented groups. This is an increase from the Baseline Report; 41 percent of projects reported using such strategies to recruit these groups in the 1997 reporting year.

International Opportunities for Trainees. Projects placed increased emphasis on international opportunities for their trainees; 59 percent of projects reported such opportunities in 1998, compared to 38 percent in 1997. The most common activities were travel to foreign meetings and conferences, work in foreign universities and research settings, and field research in conjunction with foreign researchers.

Initiatives to Prepare Trainees for Faculty Positions. Projects also placed increased emphasis on initiatives to prepare their trainees for faculty positions. Overall, 85 percent of projects reported such initiatives in 1998, compared to 54 percent in 1997. Specifically, 97 percent of the 1994 and 1995 cohorts provided these activities for their trainees.

Trainee Ph.D. Completion. By 1998, the cumulative percentage of all GRT trainees who had completed their Ph.D.s was about 12 percent, almost double the completion rate reported in 1997. Completion rates were similar for males and females, but higher for nonminorities than for minorities (13 percent and 4 percent, respectively). This gap in completion rates between minority and nonminority trainees increased between 1997 and 1998.

Years to Complete Ph.D. The 1998 cumulative data show that the average time to complete the GRT Ph.D. (5.5 years) did not vary by gender or minority status. In the 1997 reporting year, only 12 percent of GRT trainees who completed their Ph.D.s had taken 4 years or less to complete their program. By 1998, the cumulative percentage of the trainees who were able to complete their Ph.D.s in 4 years or less was 21 percent. On the other hand, the percentage of trainees who took 7 or more years to complete their Ph.D.s increased from 3 to 19 percent.

Employment Status of Trainees Who Completed Ph.D.s. Almost half of the 194 trainees who had completed their GRT Ph.D.s by the 1998 reporting period were in postdoctoral positions. Most of the others were employed as educators or by private organizations.

Attrition. The cumulative percentage of all GRT trainees who had stopped their pursuit of a Ph.D. by 1998 was 18 percent, an increase in the 10 percent cumulative attrition rate in 1997. Minority students had a higher attrition rate than nonminority

students (24 percent compared to 17 percent) in 1998. The most common reason for leaving the GRT program was to pursue employment; more than half of the Engineering and Computer and Information Sciences and the Engineering trainees who left the program did so to pursue employment.

Employment Status of Trainees Who Left GRT Program Prior to Obtaining Ph.D.s. By the 1998 reporting period, trainees who left the GRT program before completing their Ph.D. were most likely to be employed in the private sector (39 percent). Employment status was unknown for about one-fifth of former trainees. Most of the others were in graduate school either at the GRT institution or studying elsewhere.

GRT Course Features. Projects continued to develop course and/or curriculum accomplishments that will remain with the GRT-funded department after the GRT project has ended. A total of 316 new courses, other institutional offerings, or course requirements were developed by the 157 GRT projects during the 1998 reporting year alone. These institutional outcomes are in addition to the 1,061 that had already been reported during the 1997 reporting year for all years of project operation prior to the 1998 reporting year.

Conclusion

Data obtained from the GRT Distance Monitoring Survey System for the 1998 reporting year show some areas of definite progress since the 1997 Baseline Report. In recent years, NSF has increased the emphasis it places on short-term project outcomes. The data for 1998 show that over time, GRT projects have increased the range of project features such as private/public sector opportunities and multidisciplinary training activities provided to improve the educational experiences of trainees. This trend suggests that NSF's efforts to communicate to GRT principal investigators regarding the importance of these educational experiences have been increasingly successful.

On the other hand, some trends from the 1998 data, such as the higher attrition rate for minority GRT trainees than for nonminority trainees and the increase in the percentage of trainees who took 7 or more years to complete their Ph.D.s, warrant closer attention in the future. These analyses also raise questions that cannot be answered by the data contained within the monitoring system. For example, the general decrease between 1997 and 1998 reporting years in the number of years required for trainees to complete their GRT-supported Ph.D.s raises the question of whether the trainees' involvement in the GRT program had any influence on that reduction.

In the 1999 reporting year, more detailed data have been collected by the Distance Monitoring Survey on race, ethnicity, and

disability. As more trainees complete their Ph.D. programs, subsequent years of GRT trend data should provide richer information about trainee Ph.D. completion and subsequent employment. Such data can contribute to the continued refinement of the GRT program and of related agency endeavors.

Appendix A:
Other Data Obtained Through the Graduate Research Traineeship (GRT) Program Distance Monitoring Survey

Table A-1
Characteristics of GRT principal investigators and advisors, by award cohort: Reporting year 1998

Principal investigator and advisor characteristic	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
Total principal investigators	42	55	36	43	176
Gender					
Male	92.9%	76.4%	83.3%	76.7%	81.8%
Female	7.1	20.0	16.7	23.3	17.0
Minority status[1]					
Minority	7.1	5.5	8.3	2.3	5.7
Nonminority	88.1	90.9	91.7	97.7	92.0
Disability status					
Disabled	0.0	0.0	2.8	0.0	0.6
Not disabled	95.2	96.4	97.2	100.0	97.2
Citizenship					
U.S. citizen	90.5	90.9	91.7	88.4	90.3
Permanent resident	9.5	5.5	8.3	11.6	8.5
Total advisors	207	262	180	196	845
Gender					
Male	87.4%	79.0%	80.6%	83.7%	82.5%
Female	11.6	15.6	14.4	14.3	14.1
Minority status[1]					
Minority	4.3	6.5	5.0	3.6	5.0
Nonminority	91.3	82.4	80.6	87.8	85.4
Disability status					
Disabled	1.9	0.8	0.6	0.5	0.9
Not disabled	91.3	81.7	79.4	87.8	85.0
Citizenship					
U.S. citizen	85.5	82.8	85.0	82.1	83.8
Permanent resident	8.2	11.8	6.1	12.2	9.8

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

NOTE: Percents may not add to 100 because of rounding and/or data items not reported or missing.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-2
GRT trainee characteristics, by award cohort: Reporting year 1998

Trainee characteristic	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
Total trainees	449	527	320	299	1,595
Gender					
Male	59.9%	64.3%	60.3%	61.5%	61.8%
Female	38.5	33.2	39.7	37.5	36.8
Race/ethnicity					
White	71.7	70.4	70.0	80.9	72.7
Black	3.8	7.8	10.6	5.4	6.8
Hispanic	3.6	3.2	3.1	3.0	3.3
Asian	8.2	7.4	5.3	6.7	7.1
Pacific Islander	0.2	0.2	0.9	0.3	0.4
American Indian/Alaskan Native	0.9	0.8	1.3	0.3	0.8
Not reported	11.6	10.2	8.8	3.3	9.0
Minority status[1]					
Minority	8.5	12.0	15.9	9.0	11.2
Nonminority	80.0	77.8	75.3	87.6	79.7
Not reported	11.6	10.2	8.8	3.3	9.0
Disability status					
Disabled	0.9	0.8	1.3	1.3	1.0
Not disabled	80.2	78.6	81.6	88.3	81.4
Not reported	18.9	20.7	17.2	10.4	17.6
Citizenship					
U.S. citizen	85.1	91.1	92.8	91.6	89.8
Permanent resident	5.6	5.3	2.5	4.7	4.7

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

NOTE: Percents may not add to 100 because of rounding and/or data items not reported or missing.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-3
GRT trainee gender, by broad focus area, by award cohort: Reporting year 1998

Trainee gender and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees	449	527	320	299	1,595
Male					
Biological Sciences (BIO)	59.5%	47.7%	46.2%	54.1%	52.6%
Computer and Information Sciences and Engineering (CISE)	81.8	82.6	69.7	66.7	77.3
Education and Human Resources (EHR)	0.0	55.6	46.9	59.5	54.2
Engineering (ENG)	68.9	72.8	90.2	64.3	71.8
Geosciences (GEO)	52.8	67.6	44.4	40.0	54.5
Mathematical and Physical Sciences (MPS)	59.4	70.7	68.0	76.9	65.9
Social, Behavioral, and Economic Sciences (SBE)	45.8	48.1	64.2	62.5	55.3
Female					
Biological Sciences (BIO)	38.9	47.7	53.8	45.9	45.1
Computer and Information Sciences and Engineering (CISE)	18.2	17.4	30.3	20.0	21.1
Education and Human Resources (EHR)	0.0	44.4	53.1	40.5	45.8
Engineering (ENG)	31.1	26.4	9.8	34.5	27.6
Geosciences (GEO)	47.2	26.8	55.6	60.0	43.4
Mathematical and Physical Sciences (MPS)	37.0	28.0	32.0	23.1	32.1
Social, Behavioral, and Economic Sciences (SBE)	54.2	51.9	35.8	37.5	44.7

NOTE: Percents may not add to 100 because of rounding and/or data items not reported or missing.
SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-4
GRT trainee race/ethnicity, by broad focus area, by award cohort: Reporting year 1998

Trainee race/ethnicity and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees	449	527	320	299	1,595
White					
Biological Sciences (BIO)	83.3%	69.5%	66.7%	91.8%	78.3%
Computer and Information Sciences and Engineering (CISE)	63.6	82.6	51.5	73.3	71.9
Education and Human Resources (EHR)	0.0	88.9	87.5	90.5	89.2
Engineering (ENG)	67.8	66.4	68.3	69.0	67.6
Geosciences (GEO)	94.4	66.2	72.2	100.0	75.7
Mathematical and Physical Sciences (MPS)	64.5	70.7	78.0	79.5	70.2
Social, Behavioral, and Economic Sciences (SBE)	54.2	66.7	64.2	66.7	61.8
Black					
Biological Sciences (BIO)	4.8	6.0	10.3	3.5	5.5
Computer and Information Sciences and Engineering (CISE)	0.0	4.3	33.3	6.7	11.7
Education and Human Resources (EHR)	0.0	0.0	9.4	4.8	6.0
Engineering (ENG)	6.7	12.0	17.1	6.0	9.7
Geosciences (GEO)	0.0	1.4	6.9	0.0	3.2
Mathematical and Physical Sciences (MPS)	2.9	9.3	4.0	5.1	5.0
Social, Behavioral, and Economic Sciences (SBE)	2.1	22.2	3.8	12.5	7.9
Hispanic					
Biological Sciences (BIO)	3.2	4.6	0.0	1.2	3.0
Computer and Information Sciences and Engineering (CISE)	0.0	2.9	0.0	0.0	1.6
Education and Human Resources (EHR)	0.0	11.1	0.0	2.4	2.4
Engineering (ENG)	5.6	2.4	2.4	6.0	4.1
Geosciences (GEO)	0.0	1.4	6.9	0.0	3.2
Mathematical and Physical Sciences (MPS)	2.2	2.7	4.0	0.0	2.3
Social, Behavioral, and Economic Sciences (SBE)	8.3	3.7	3.8	8.3	5.9
Asian					
Biological Sciences (BIO)	3.2	3.3	0.0	3.5	3.0
Computer and Information Sciences and Engineering (CISE)	36.4	7.2	12.1	6.7	10.9
Education and Human Resources (EHR)	0.0	0.0	3.1	2.4	2.4
Engineering (ENG)	11.1	14.4	4.9	13.1	12.1
Geosciences (GEO)	5.6	5.6	8.3	0.0	6.3
Mathematical and Physical Sciences (MPS)	6.5	8.0	2.0	10.3	6.6
Social, Behavioral, and Economic Sciences (SBE)	16.7	3.7	5.7	0.0	7.9
Pacific Islander					
Biological Sciences (BIO)	0.0	0.0	0.0	0.0	0.0
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	0.0	0.0	0.0
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	0.0	0.0	0.0	0.0	0.0
Geosciences (GEO)	0.0	1.4	2.8	0.0	1.6
Mathematical and Physical Sciences (MPS)	0.0	0.0	2.0	2.6	0.7
Social, Behavioral, and Economic Sciences (SBE)	2.1	0.0	0.0	0.0	0.7

Table A-4
GRT trainee race/ethnicity, by broad focus area, by award cohort: Reporting year 1998 (Continued)

Trainee race/ethnicity and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
American Indian/Alaskan Native					
Biological Sciences (BIO)	0.0	0.7	7.7	0.0	1.0
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	0.0	0.0	0.0
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	1.1	2.4	0.0	1.2	1.5
Geosciences (GEO)	0.0	0.0	1.4	0.0	0.5
Mathematical and Physical Sciences (MPS)	0.7	0.0	0.0	0.0	0.3
Social, Behavioral, and Economic Sciences (SBE)	4.2	0.0	0.0	0.0	1.3

NOTE: Percents may not add to 100 because of rounding and/or data items not reported or missing.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-5
GRT trainee minority status, by broad focus area, by award cohort: Reporting year 1998

Trainee minority status[1] and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees	449	527	320	299	1,595
Minority					
Biological Sciences (BIO)	7.9%	11.3%	17.9%	4.7%	9.5%
Computer and Information Sciences and Engineering (CISE)	0.0	7.2	33.3	6.7	13.3
Education and Human Resources (EHR)	0.0	11.1	9.4	7.1	8.4
Engineering (ENG)	13.3	16.8	19.5	13.1	15.3
Geosciences (GEO)	0.0	4.2	18.1	0.0	8.5
Mathematical and Physical Sciences (MPS)	5.8	12.0	10.0	7.7	8.3
Social, Behavioral, and Economic Sciences (SBE)	16.7	25.9	7.5	20.8	15.8
Nonminority					
Biological Sciences (BIO)	86.5	72.8	66.7	95.3	81.3
Computer and Information Sciences and Engineering (CISE)	100.0	89.9	63.6	80.0	82.8
Education and Human Resources (EHR)	0.0	88.9	90.6	92.9	91.6
Engineering (ENG)	78.9	80.8	73.2	82.1	79.7
Geosciences (GEO)	100.0	71.8	80.6	100.0	82.0
Mathematical and Physical Sciences (MPS)	71.0	78.7	80.0	89.7	76.8
Social, Behavioral, and Economic Sciences (SBE)	70.8	70.4	69.8	66.7	69.7

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

NOTE: Percents may not add to 100 because of rounding and/or data items not reported or missing.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-6
GRT trainee disability status, by broad focus area, by award cohort: Reporting year 1998

Trainee disability status and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees	449	527	320	299	1,595
Disabled					
Biological Sciences (BIO)	0.8%	0.7%	0.0%	0.0%	0.5%
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	6.1	6.7	2.3
Education and Human Resources (EHR)	0.0	0.0	0.0	4.8	2.4
Engineering (ENG)	0.0	0.0	0.0	0.0	0.0
Geosciences (GEO)	0.0	1.4	0.0	0.0	0.5
Mathematical and Physical Sciences (MPS)	1.4	2.7	4.0	0.0	2.0
Social, Behavioral, and Economic Sciences (SBE)	2.1	0.0	0.0	4.2	1.3
Not disabled					
Biological Sciences (BIO)	92.9	83.4	71.8	96.5	88.0
Computer and Information Sciences and Engineering (CISE)	100.0	92.8	93.9	66.7	90.6
Education and Human Resources (EHR)	0.0	100.0	100.0	88.1	94.0
Engineering (ENG)	83.3	76.8	87.8	94.0	84.1
Geosciences (GEO)	91.7	39.4	83.3	90.0	68.8
Mathematical and Physical Sciences (MPS)	62.3	85.3	70.0	92.3	73.2
Social, Behavioral, and Economic Sciences (SBE)	79.2	100.0	73.6	45.8	75.7

NOTE: Percents may not add to 100 because of rounding and/or data items not reported or missing.
SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-7
GRT trainee citizenship status, by broad focus area, by award cohort: Reporting year 1998

Trainee citizenship status and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees	449	527	320	299	1,595
U.S. citizen					
Biological Sciences (BIO)	96.8%	94.0%	94.9%	94.1%	95.0%
Computer and Information Sciences and Engineering (CISE)	63.6	87.0	93.9	93.3	87.5
Education and Human Resources (EHR)	0.0	100.0	100.0	97.6	98.8
Engineering (ENG)	88.9	88.8	97.6	88.1	89.7
Geosciences (GEO)	100.0	97.2	93.1	90.0	95.8
Mathematical and Physical Sciences (MPS)	70.3	85.3	84.0	89.7	78.8
Social, Behavioral, and Economic Sciences (SBE)	83.3	92.6	90.6	87.5	88.2
Permanent resident					
Biological Sciences (BIO)	1.6	2.0	0.0	0.0	1.2
Computer and Information Sciences and Engineering (CISE)	36.4	8.7	6.1	6.7	10.2
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	4.4	10.4	2.4	11.9	8.2
Geosciences (GEO)	0.0	0.0	2.8	10.0	1.6
Mathematical and Physical Sciences (MPS)	9.4	8.0	2.0	2.6	7.0
Social, Behavioral, and Economic Sciences (SBE)	4.2	0.0	3.8	4.2	3.3

NOTE: Percents may not add to 100 because of rounding and/or data items not reported or missing.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-8
Comparisons of GRT trainee participation with national graduate student enrollment, by broad focus area, by gender

Survey and focus area	Total	Male	Female
NSF GRT Monitoring System: 1998 reporting year			
Total trainees	1,572	985 62.7%	587 37.3%
Biological Sciences (BIO)	392	53.8	46.2
Computer and Information Sciences and Engineering (CISE)	126	78.6	21.4
Education and Human Resources (EHR)	83	54.2	45.8
Engineering (ENG)	338	72.2	27.8
Geosciences (GEO)	185	55.7	44.3
Mathematical and Physical Sciences (MPS)	296	67.2	32.8
Social, Behavioral, and Economic Sciences (SBE)	152	55.3	44.7
NSF Survey of Graduate Students and Postdoctorates in Science and Engineering: 1997			
Total, science and engineering fields	308,835	175,074 56.7%	133,761 43.3%
Biological Sciences (BIO)	55,054	50.6	49.4
Computer and Information Sciences and Engineering (CISE)	23,202	73.3	26.7
Education and Human Resources (EHR)	NA	NA	NA
Engineering (ENG)	64,586	80.6	19.4
Geosciences (GEO)	12,128	60.9	39.1
Mathematical and Physical Sciences (MPS)	31,405	68.1	31.9
Social, Behavioral, and Economic Sciences (SBE)	122,460	40.3	59.7

NA = Not available; data for this focus area were not collected by the GSS survey.

NOTE: For comparability, GRT data on trainees for whom gender was unknown were not included in this table. Since GSS racial/ethnic data are available only for U.S. citizens and permanent residents, percentages are calculated using only data for citizens and permanent residents. The 1995 GSS data in Table 5 of this 1998 GRT Trends Report should be used as the new baseline to compare GRT data to national trends, rather than the GSS data in Table 3-2 of the GRT baseline report, which were incorrect. Percents may not add to 100 because of rounding.

SOURCE: GRT Distance Monitoring Survey Systems, reporting year 1998, and special tabulations of the National Science Foundation 1997 Survey of Graduate Students and Postdoctorates in Science and Engineering.

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Table A-9
Comparisons of GRT trainee participation with national graduate student enrollment, by broad focus area, by race/ethnicity

Survey and focus area	Total	Race/ethnicity					
		White	Black	Hispanic	Asian/ Pacific Islander	American Indian/ Alaskan Native	Not reported
GRT Monitoring System: 1998 reporting year							
Total trainees	1,595	1,159	108	52	119	13	144
		72.7%	6.8%	3.3%	7.5%	0.8%	9.0%
Biological Sciences (BIO)	401	78.3	5.5	3.0	3.0	1.0	9.2
Computer and Information Sciences and Engineering (CISE)	128	71.9	11.7	1.6	10.9	0.0	3.9
Education and Human Resources (EHR)	83	89.2	6.0	2.4	2.4	0.0	0.0
Engineering (ENG)	340	67.6	9.7	4.1	12.1	1.5	5.0
Geosciences (GEO)	189	75.7	3.2	3.2	7.9	0.5	9.5
Mathematical and Physical Sciences (MPS)	302	70.2	5.0	2.3	7.3	0.3	14.9
Social, Behavioral, and Economic Sciences (SBE)	152	61.8	7.9	5.9	8.6	1.3	14.5
NSF Survey of Graduate Students and Postdoctorates in Science and Engineering: 1997							
Total, science and engineering fields	308,835	227,936	19,363	14,988	26,078	1,599	18,871
		73.8%	6.3%	4.9%	8.4%	0.5%	6.1%
Biological Sciences (BIO)	55,054	77.7	4.4	4.3	8.7	0.5	4.4
Computer and Information Sciences and Engineering (CISE)	23,202	60.6	5.6	3.1	20.3	0.3	10.2
Education and Human Resources (EHR)	NA	NA	NA	NA	NA	NA	NA
Engineering (ENG)	64,586	71.2	4.4	4.4	12.6	0.4	7.0
Geosciences (GEO)	12,128	86.5	1.7	3.4	3.4	0.7	4.4
Mathematical and Physical Sciences (MPS)	31,405	76.8	5.1	3.9	8.6	0.4	5.3
Social, Behavioral, and Economic Sciences (SBE)	122,460	73.9	9.0	6.1	4.4	0.7	6.0

NA = Not available; data for this focus area were not collected by the GSS survey.

NOTE: For comparability, GRT data on trainees for whom gender was unknown were not included in this table. Since GSS racial/ethnic data are available only for U.S. citizens and permanent residents, percentages are calculated using only data for citizens and permanent residents. The GSS data on race/ethnicity for 1995 presented in Table 3-4 of the GRT Baseline Report mistakenly excluded data on women students; therefore, the 1995 GSS data in Table 6 of this 1998 GRT Trends Report should be used as the new baseline to compare GRT data to national trends. Percents may not add to 100 because of rounding.

SOURCE: GRT Distance Monitoring Survey Systems, reporting year 1998, and special tabulations of the National Science Foundation 1997 Survey of Graduate Students and Postdoctorates in Science and Engineering.

Table A-10
GRT projects reporting specific recruitment strategies, by award cohort: Reporting year 1998

Recruitment strategy	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Projects reporting 1 or more strategies	78.9%	91.7%	100.0%	92.1%	90.4%
Brochures, posters, or other non-electronic media citing NSF-GRT	55.3	79.2	78.8	76.3	72.6
Developed by GRT	61.9	81.6	76.9	86.2	78.1
Ads in scholarly journals or electronic media citing NSF-GRT funds	34.2	56.3	48.5	57.9	49.7
Developed by GRT	61.5	85.2	81.3	90.9	82.1
Visits to minority-serving institutions or women's colleges	23.7	47.9	33.3	42.1	37.6
Developed by GRT	66.7	73.9	72.7	75.0	72.9
Other efforts directed toward individuals from underserved populations	42.1	47.9	54.5	57.9	50.3
Developed by GRT	68.8	87.0	55.6	59.1	68.4
Visits to predominately undergraduate institutions	18.4	22.9	33.3	39.5	28.0
Developed by GRT	85.7	54.5	45.5	80.0	65.9
Promotion of GRT project at national meetings and/or graduate student fairs	21.1	45.8	48.5	57.9	43.3
Developed by GRT	75.0	86.4	75.0	86.4	82.4
Recruitment of undergraduate/graduate students already enrolled at GRT institutions	39.5	56.3	60.6	55.3	52.9
Developed by GRT	73.3	85.2	70.0	85.7	79.5
Financial support for bringing prospective trainees to visit GRT project	31.6	64.6	57.6	55.3	52.9
Developed by GRT	58.3	61.3	47.4	71.4	60.2
Other	18.4	20.8	33.3	31.6	25.5
Developed by GRT	71.4	80.0	63.6	91.7	77.5

NOTE: "Developed by GRT" refers to the percentage of projects reporting use of strategy that also reported it was developed by the GRT project.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-11
GRT projects reporting specific project features, by award cohort: Reporting year 1998

Project feature	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Multidisciplinary training activities	73.7%	89.6%	97.0%	100.0%	89.8%
Instruction/academic support provided by faculty from multiple departments	55.3	72.9	84.8	81.6	73.2
Developed by GRT	61.9	62.9	57.1	58.1	60.0
Supported trainees from a variety of departments	39.5	52.1	63.6	60.5	53.5
Developed by GRT	93.3	84.0	76.2	82.6	83.3
Offered multidisciplinary courses	63.2	58.3	66.7	78.9	66.2
Developed by GRT	58.3	71.4	54.5	76.7	66.3
Other multidisciplinary training activities	39.5	52.1	75.8	50.0	53.5
Developed by GRT	60.0	84.0	68.0	89.5	76.2
Public/private sector opportunities	50.0	64.6	78.8	73.7	66.2
Internships in industry/private/nonprofit/public sectors	23.7	37.5	36.4	44.7	35.7
Developed by GRT	55.6	66.7	50.0	64.7	60.7
Educational/research/advisors/collaborators from industry/private/ nonprofit/public sectors	34.2	35.4	48.5	42.1	39.5
Developed by GRT	61.5	64.7	62.5	62.5	62.9
Other research/educational contact with industry/private/nonprofit/ public sectors	31.6	39.6	48.5	36.8	38.9
Developed by GRT	41.7	52.6	68.8	64.3	57.4
Other private/public sector opportunities	10.5	8.3	27.3	5.3	12.1
Developed by GRT	75.0	50.0	55.6	100.0	63.2
International opportunities	42.1	58.3	69.7	65.8	58.6
Work in university/research setting outside United States	18.4	31.3	33.3	26.3	27.4
Developed by GRT	71.4	86.7	54.5	60.0	69.8
Field research with foreign researchers outside United States	10.5	22.9	33.3	18.4	21.0
Developed by GRT	50.0	54.5	36.4	14.3	39.4
Travel to meetings/conferences outside United States	23.7	45.8	51.5	31.6	38.2
Developed by GRT	77.8	40.9	58.8	25.0	48.3
Work with private companies outside United States	2.6	10.4	9.1	5.3	7.0
Developed by GRT	0.0	60.0	66.7	50.0	54.5
Other international opportunities	2.6	14.6	21.2	26.3	15.9
Developed by GRT	0.0	14.3	42.9	70.0	44.0
Initiatives to prepare trainees for faculty positions	71.1	79.2	97.0	97.4	85.4
Instruction in effective teaching practices	28.9	50.0	51.5	44.7	43.9
Developed by GRT	9.1	37.5	29.4	17.6	26.1
Served as teaching assistants and/or or official mentors to students	50.0	60.4	90.9	78.9	68.8
Developed by GRT	36.8	34.5	56.7	26.7	38.9
Participated in teaching exercises supervised by faculty	28.9	47.9	51.5	36.8	41.4
Developed by GRT	54.5	43.5	64.7	64.3	55.4
Developed course/curriculum materials	10.5	20.8	60.6	34.2	29.9
Developed by GRT	25.0	20.0	65.0	61.5	51.1
Served as full instructor	7.9	18.8	30.3	23.7	19.7
Developed by GRT	66.7	33.3	50.0	33.3	41.9
Special instruction in how to advise/mentor students	10.5	14.6	18.2	10.5	13.4
Developed by GRT	25.0	42.9	16.7	25.0	28.6
Instruction in how to apply advanced technology in classroom	15.8	10.4	39.4	18.4	19.7
Developed by GRT	50.0	80.0	38.5	42.9	48.4
Other initiatives	10.5	29.2	24.2	18.4	21.0
Developed by GRT	75.0	64.3	87.5	71.4	72.7

Table A-11
GRT projects reporting specific project features, by award cohort: Reporting year 1998 (Continued)

Project feature	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Other structural components	15.8	54.2	63.6	63.2	49.0
Developed by GRT	66.7	69.2	76.2	87.5	76.6

NOTE: "Developed by GRT" refers to the percentage of projects reporting use of strategy that also reported it was developed by the GRT project.
SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-12
GRT projects reporting consortial agreements, by award cohort: Reporting year 1998

Consortial agreement	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
Total number of project awards	38	48	33	38	157
Projects reporting at least one consortial agreement[1]	28.9%	52.1%	39.4%	47.4%	42.7%
Nongraduate consortial agreements[2]	13.2	14.6	21.2	21.1	17.2
Graduate consortial agreements[3]	15.8	27.1	18.2	28.9	22.9
Minority consortial agreements[4]	21.1	31.3	18.2	26.3	24.8

[1]Combinations or groups formed to undertake an enterprise beyond the resources of any one member.

[2]Nongraduate institution serves as a feeder school for a GRT project by identifying students for recruiting purposes.

[3]Consortial arrangements with another graduate-degree-granting institution. Under this arrangement, trainees might be provided opportunities to engage in special research and training at lower institutions.

[4]Arrangements that are specifically designed to increase the pool of minority trainees at GRT projects.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-13
Average number of achievements per GRT trainee, overall and by broad focus area, by award cohort: Reporting year 1998

Trainee achievement[1] and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Average number of achievements per trainee	2.1	1.6	2.4	3.0	2.2
Average number of achievements by broad focus area					
Biological Sciences (BIO)	2.8	2.3	2.8	2.4	2.5
Computer and Information Sciences and Engineering (CISE)	0.2	1.1	2.0	2.7	1.5
Education and Human Resources (EHR)	0.0	2.6	5.0	5.5	5.0
Engineering (ENG)	2.3	1.3	2.4	3.0	2.1
Geosciences (GEO)	1.6	1.1	2.6	1.8	1.8
Mathematical and Physical Sciences (MPS)	1.8	1.6	1.3	2.1	1.7
Social, Behavioral, and Economic Sciences (SBE)	2.1	1.6	1.6	2.4	1.9
Percentage of trainees with at least one achievement	45.4%	47.2%	66.9%	70.6%	55.0%

[1]Achievements include journal articles, books, book chapters, presentations, patent applications, patents, and other scholarly achievements.
SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-14
GRT trainee Ph.D. completion, by award cohort: Reporting year 1998

Trainee characteristic	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees who completed Ph.D.	101	56	23	14	194
Percentage of trainees who completed Ph.D.	22.5%	10.6%	7.2%	4.7%	12.2%
Gender					
Male	22.7	10.9	8.3	5.4	12.6
Female	23.1	9.7	5.5	3.6	11.6
Minority status[1]					
Minority	7.9	1.6	5.9	0.0	3.9
Nonminority	25.1	10.2	7.9	5.0	12.9
Disability status					
Disabled	0.0	25.0	0.0	25.0	12.5
Not disabled	24.2	9.9	7.3	4.5	12.2
Broad focus area					
Biological Sciences (BIO)	26.2	8.6	7.7	8.2	14.0
Computer and Information Sciences and Engineering (CISE)	18.2	15.9	6.1	0.0	11.7
Education and Human Resources (EHR)	0.0	0.0	18.8	9.5	12.0
Engineering (ENG)	17.8	5.6	2.4	2.4	7.6
Geosciences (GEO)	38.9	14.1	2.8	0.0	13.8
Mathematical and Physical Sciences (MPS)	21.0	18.7	14.0	2.6	16.9
Social, Behavioral, and Economic Sciences (SBE)	14.6	3.7	3.8	0.0	6.6

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-15
Average years required for GRT trainees to complete Ph.D., by award cohort: Reporting year 1998

Trainee characteristic	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees who completed Ph.D.	101	56	23	14	194
Average for trainees who completed Ph.D.	5.5	5.4	5.6	5.8	5.5
Gender					
Male	5.6	5.9	5.6	5.0	5.6
Female	5.5	5.1	5.6	6.1	5.4
Minority status[1]					
Minority	6.3	4.0	5.3	--	5.6
Nonminority	5.5	5.5	5.5	5.8	5.5
Disability status					
Disabled	--	7.0	--	11.0	9.0
Not disabled	5.5	5.4	5.5	5.7	5.5
Broad focus area					
Biological Sciences (BIO)	5.7	5.5	5.0	5.3	5.5
Computer and Information Sciences and Engineering (CISE)	3.5	6.1	6.5	--	5.8
Education and Human Resources (EHR)	--	--	5.8	7.0	6.3
Engineering (ENG)	5.3	4 4	3.0	6.0	5.0
Geosciences (GEO)	5.4	5.4	5.5	--	5.4
Mathematical and Physical Sciences (MPS)	5.7	5.1	4.7	4.0	5.3
Social, Behavioral, and Economic Sciences (SBE)	6.0	6.0	9.0	--	6.8

--No one in this category completed a Ph.D.

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-16
Years required for GRT trainees to complete Ph.D., by award cohort: Reporting year 1998

Years to complete Ph.D.	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees who completed Ph.D.	101	56	23	14	194
Years to complete Ph.D.					
3 years or less	3.0%	14.3%	17.4%	7.1%	8.2%
4 years	13.9	12.5	8.7	14.3	12.9
5 years	28.7	28.6	13.0	7.1	25.3
6 years	27.7	19.6	39.1	57.1	28.9
7 or more years	15.8	25.0	21.7	14.3	19.1

NOTE: Percents may not add to 100 because of rounding and/or data not reported or missing.
SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-17
Years required for GRT trainees to complete Ph.D., by gender and minority status, by award cohort: Reporting year 1998

Years to complete Ph.D. and trainee characteristics	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
3 years or less					
Gender					
Male	3.3%	16.2%	25.0%	0.0%	9.7%
Female	2.5	11.8	0.0	25.0	5.9
Minority status[1]					
Minority	0.0	0.0	0.0	0.0	0.0
Nonminority	2.2	11.9	21.1	7.7	7.3
4 years					
Gender					
Male	14.8	16.2	6.3	20.0	14.5
Female	12.5	5.9	14.3	0.0	10.3
Minority status[1]					
Minority	0.0	100.0	33.3	0.0	28.6
Nonminority	13.3	11.9	5.3	15.4	12.2
5 years					
Gender					
Male	32.8	27.0	12.5	10.0	26.6
Female	22.5	29.4	14.3	0.0	22.1
Minority status[1]					
Minority	0.0	0.0	0.0	0.0	0.0
Nonminority	31.1	28.6	15.8	7.7	26.8
6 years					
Gender					
Male	23.0	18.9	25.0	50.0	24.2
Female	35.0	17.6	71.4	75.0	36.8
Minority status[1]					
Minority	66.7	0.0	66.7	0.0	57.1
Nonminority	25.6	19.0	36.8	53.8	27.4
7 or more years					
Gender					
Male	18.0	21.6	31.3	20.0	21.0
Female	12.5	35.3	0.0	0.0	16.2
Minority status[1]					
Minority	33.3	0.0	0.0	0.0	14.3
Nonminority	15.6	28.6	21.1	15.4	19.5

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

NOTE: Percents may not add to 100 because of rounding and/or data not reported or missing.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-18
Years required for GRT trainees to complete Ph.D., by broad focus area, by award cohort: Reporting year 1998

Years to complete Ph.D.	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
3 years or less					
Biological Sciences (BIO)	0.0%	23.1%	33.3%	14.3%	8.9%
Computer and Information Sciences and Engineering (CISE)	50.0	0.0	0.0	0.0	6.7
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	0.0	28.6	100.0	0.0	11.5
Geosciences (GEO)	7.1	10.0	0.0	0.0	7.7
Mathematical and Physical Sciences (MPS)	3.4	14.3	28.6	0.0	9.8
Social, Behavioral, and Economic Sciences (SBE)	0.0	0.0	0.0	0.0	0.0
4 years					
Biological Sciences (BIO)	9.1	7.7	0.0	14.3	8.9
Computer and Information Sciences and Engineering (CISE)	50.0	0.0	0.0	0.0	6.7
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	43.8	14.3	0.0	0.0	30.8
Geosciences (GEO)	0.0	10.0	0.0	0.0	3.8
Mathematical and Physical Sciences (MPS)	6.9	28.6	28.6	100.0	17.6
Social, Behavioral, and Economic Sciences (SBE)	14.3	0.0	0.0	0.0	10.0
5 years					
Biological Sciences (BIO)	21.2	15.4	0.0	0.0	16.1
Computer and Information Sciences and Engineering (CISE)	0.0	45.5	0.0	0.0	33.3
Education and Human Resources (EHR)	0.0	0.0	16.7	25.0	20.0
Engineering (ENG)	25.0	42.9	0.0	0.0	26.9
Geosciences (GEO)	42.9	20.0	50.0	0.0	34.6
Mathematical and Physical Sciences (MPS)	37.9	28.6	14.3	0.0	31.4
Social, Behavioral, and Economic Sciences (SBE)	14.3	0.0	0.0	0.0	10.0
6 years					
Biological Sciences (BIO)	36.4	30.8	66.7	57.1	39.3
Computer and Information Sciences and Engineering (CISE)	0.0	18.2	50.0	0.0	20.0
Education and Human Resources (EHR)	0.0	0.0	83.3	50.0	70.0
Engineering (ENG)	12.5	0.0	0.0	100.0	15.4
Geosciences (GEO)	35.7	40.0	50.0	0.0	38.5
Mathematical and Physical Sciences (MPS)	27.6	0.0	0.0	0.0	15.7
Social, Behavioral, and Economic Sciences (SBE)	14.3	100.0	0.0	0.0	20.0

Table A-18
Years required for GRT trainees to complete Ph.D., by broad focus area, by award cohort: Reporting year 1998 (Continued)

Years to complete Ph.D.	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
7 or more years					
Biological Sciences (BIO)	12.1	23.1	0.0	14.3	14.3
Computer and Information Sciences and Engineering (CISE)	0.0	36.4	50.0	0.0	33.3
Education and Human Resources (EHR)	0.0	0.0	0.0	25.0	10.0
Engineering (ENG)	18.8	14.3	0.0	0.0	15.4
Geosciences (GEO)	14.3	20.0	0.0	0.0	15.4
Mathematical and Physical Sciences (MPS)	17.2	28.6	28.6	0.0	21.6
Social, Behavioral, and Economic Sciences (SBE)	28.6	0.0	100.0	0.0	40.0

NOTE: Percents may not add to 100 because of rounding and/or data not reported or missing.
SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-19
Employment status of GRT trainees who completed Ph.D., by award cohort: Reporting year 1998

Employment status	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
Total trainees who completed Ph.D.	101	56	23	14	194
Postdoctoral position	52.5%	41.1%	47.8%	57.1%	49.0%
Education employment	15.8	14.3	43.5	14.3	18.6
Government employment	6.9	3.6	0.0	7.1	5.2
Private employment	16.8	37.5	8.7	14.3	21.6
Other employment	5.0	1.8	0.0	0.0	3.1
Unknown	3.0	1.8	0.0	7.1	2.6

NOTE: Percents may not add to 100 because of rounding.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-20

Employment status of GRT trainees who completed Ph.D., by gender and minority status, by award cohort: Reporting year 1998

Employment status and trainee characteristics	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
Total trainees who completed Ph.D.	101	56	23	14	194
Postdoctoral position					
Gender					
Male	50.8%	45.9%	43.8%	60.0%	49.2%
Female	55.0	35.3	57.1	50.0	50.0
Minority status[1]					
Minority	66.7	100.0	0.0	0.0	42.9
Nonminority	54.4	38.1	52.6	61.5	50.6
Education employment					
Gender					
Male	13.1	16.2	50.0	10.0	18.5
Female	20.0	11.8	28.6	25.0	19.1
Minority status[1]					
Minority	0.0	0.0	100.0	0.0	42.9
Nonminority	14.4	14.3	36.8	15.4	17.1
Government employment					
Gender					
Male	9.8	0.0	0.0	10.0	5.6
Female	2.5	11.8	0.0	0.0	4.4
Minority status[1]					
Minority	33.3	0.0	0.0	0.0	14.3
Nonminority	6.7	4.8	0.0	7.7	5.5
Private employment					
Gender					
Male	19.7	37.8	6.3	10.0	22.6
Female	12.5	35.3	14.3	25.0	19.1
Minority status[1]					
Minority	0.0	0.0	0.0	0.0	0.0
Nonminority	17.8	40.5	10.5	7.7	22.0
Other employment					
Gender					
Male	3.3	0.0	0.0	0.0	1.6
Female	7.5	5.9	0.0	0.0	5.9
Minority status[1]					
Minority	0.0	0.0	0.0	0.0	0.0
Nonminority	3.3	2.4	0.0	0.0	2.4
Unknown					
Gender					
Male	3.3	0.0	0.0	10.0	2.4
Female	2.5	0.0	0.0	0.0	1.5
Minority status[1]					
Minority	0.0	0.0	0.0	0.0	0.0
Nonminority	3.3	0.0	0.0	7.7	2.4

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

NOTE: Percents may not add to 100 because of rounding and/or data not reported or missing.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-21
Employment status of GRT trainees who completed Ph.D., by broad focus area, by award cohort: Reporting year 1998

Employment status and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees who completed Ph.D.	101	56	23	14	194
Postdoctoral position					
Biological Sciences (BIO)	75.8%	84.6%	66.7%	71.4%	76.8%
Computer and Information Sciences and Engineering (CISE)	100.0	9.1	100.0	0.0	33.3
Education and Human Resources (EHR)	0.0	0.0	66.7	50.0	60.0
Engineering (ENG)	37.5	14.3	0.0	50.0	30.8
Geosciences (GEO)	64.3	50.	50.0	0.0	57.7
Mathematical and Physical Sciences (MPS)	27.6	35.7	14.3	0.0	27.5
Social, Behavioral, and Economic Sciences (SBE)	42.9	0.0	50.0	0.0	40.0
Education employment					
Biological Sciences (BIO)	15.2	7.7	33.3	14.3	14.3
Computer and Information Sciences and Engineering (CISE)	0.0	36.4	0.0	0.0	26.7
Education and Human Resources (EHR)	0.0	0.0	33.3	25.0	30.0
Engineering (ENG)	12.5	0.0	100.0	0.0	11.5
Geosciences (GEO)	7.1	20.0	0.0	0.0	11.5
Mathematical and Physical Sciences (MPS)	13.8	0.0	71.4	0.0	17.6
Social, Behavioral, and Economic Sciences (SBE)	57.1	100.0	50.0	0.0	60.0
Government employment					
Biological Sciences (BIO)	6.1	0.0	0.0	0.0	3.6
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	0.0	0.0	0.0
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	12.5	0.0	0.0	0.0	7.7
Geosciences (GEO)	14.3	0.0	0.0	0.0	7.7
Mathematical and Physical Sciences (MPS)	3.4	14.3	0.0	100.0	7.8
Social, Behavioral, and Economic Sciences (SBE)	0.0	0.0	0.0	0.0	0.0
Private employment					
Biological Sciences (BIO)	3.0	0.0	0.0	14.3	3.6
Computer and Information Sciences and Engineering (CISE)	0.0	54.5	0.0	0.0	40.0
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	37.5	85.7	0.0	50.0	50.0
Geosciences (GEO)	14.3	20.0	50.0	0.0	19.2
Mathematical and Physical Sciences (MPS)	27.6	50.0	14.3	0.0	31.4
Social, Behavioral, and Economic Sciences (SBE)	0.0	0.0	0.0	0.0	0.0
Other employment					
Biological Sciences (BIO)	0.0	7.7	0.0	0.0	1.8
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	0.0	0.0	0.0
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	0.0	0.0	0.0	0.0	0.0
Geosciences (GEO)	0.0	0.0	0.0	0.0	0.0
Mathematical and Physical Sciences (MPS)	17.2	0.0	0.0	0.0	9.8
Social, Behavioral, and Economic Sciences (SBE)	0.0	0.0	0.0	0.0	0.0

Table A-21
Employment status of GRT trainees who completed Ph.D., by broad focus area, by award cohort: Reporting year 1998 (continued)

Employment status and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Unknown					
Biological Sciences (BIO)	0.0	0.0	0.0	0.0	0.0
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	0.0	0.0	0.0
Education and Human Resources (EHR)	0.0	0.0	0.0	25.0	10.0
Engineering (ENG)	0.0	0.0	0.0	0.0	0.0
Geosciences (GEO)	0.0	10.0	0.0	0.0	3.8
Mathematical and Physical Sciences (MPS)	10.3	0.0	0.0	0.0	5.9
Social, Behavioral, and Economic Sciences (SBE)	0.0	0.0	0.0	0.0	0.0

NOTE: Percents may not add to 100 because of rounding and/or data not reported or missing.
SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-22
GRT trainee attrition prior to Ph.D. completion, by award cohort: Reporting year 1998

Trainee characteristic	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees who terminated Ph.D.	75	114	56	35	280
Percentage of trainees who terminated Ph.D.	16.7%	21.6%	17.5%	11.7%	17.5%
Gender					
Male	14.1	23.3	17.6	9.2	17.1
Female	20.8	19.4	17.3	16.1	18.7
Minority status[1]					
Minority	26.3	25.4	23.5	14.8	23.5
Nonminority	16.2	21.7	14.9	11.8	16.8
Disability status					
Disabled	25.0	25.0	50.0	0.0	25.0
Not disabled	16.1	20.0	15.7	12.9	16.6
Broad focus area					
Biological Sciences (BIO)	8.7	10.6	25.6	5.9	10.5
Computer and Information Sciences and Engineering (CISE)	27.3	23.2	27.3	13.3	23.4
Education and Human Resources (EHR)	0.0	0.0	6.3	7.1	6.0
Engineering (ENG)	22.2	43.2	19.5	20.2	29.1
Geosciences (GEO)	19.4	8.5	9.7	0.0	10.6
Mathematical and Physical Sciences (MPS)	17.4	18.7	28.0	17.9	19.5
Social, Behavioral, and Economic Sciences (SBE)	20.8	29.6	11.3	4.2	16.4

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-23
Reasons for GRT trainee attrition prior to Ph.D. completion, by award cohort: Reporting year 1998

Reason for attrition	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees who terminated Ph.D.	75	114	56	35	280
Left to pursue other academic interests	28.0%	22.8%	30.4%	34.3%	27.1%
Left to pursue employment	40.0	54.4	32.1	42.9	44.6
Failed to meet requirements	6.7	7.0	7.1	2.9	6.4
Left due to family and /or economic constraints	4.0	5.3	10.7	17.1	7.5
Other	12.0	5.3	14.3	2.9	8.6
Unknown	8.0	5.3	5.4	0.0	5.4
Not reported	1.3	0.0	0.0	0.0	0.4

NOTE: Percents may not add to 100 because of rounding.
SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-24
Reasons for GRT trainee attrition prior to Ph.D. completion, by gender and minority status, by award cohort: Reporting year 1998

Reason for attrition and trainee characteristic	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees who terminated Ph.D.	75	114	56	35	280
Left to pursue other academic interests					
Gender					
Male	39.5%	15.2%	35.3%	41.2%	27.4%
Female	16.7	41.2	22.7	27.8	27.3
Minority status[1]					
Minority	40.0	18.8	16.7	25.0	23.8
Nonminority	29.3	22.5	36.1	35.5	28.5
Left to pursue employment					
Gender					
Male	31.6	63.3	29.4	41.2	47.0
Female	47.2	35.3	36.4	44.4	40.9
Minority status[1]					
Minority	20.0	37.5	50.0	50.0	38.1
Nonminority	41.4	58.4	27.8	41.9	46.3
Failed to meet requirements					
Gender					
Male	5.3	5.1	8.8	5.9	6.0
Female	8.3	11.8	4.5	0.0	7.3
Minority status[1]					
Minority	0.0	25.0	8.3	25.0	14.3
Nonminority	6.9	4.5	5.6	0.0	4.7
Left due to family and/or economic constraints					
Gender					
Male	0.0	5.1	8.8	11.8	5.4
Female	8.3	5.9	13.6	22.2	10.9
Minority status[1]					
Minority	0.0	6.3	8.3	0.0	4.8
Nonminority	3.4	5.6	11.1	19.4	7.9
Other					
Gender					
Male	13.2	6.3	11.8	0.0	8.3
Female	11.1	2.9	18.2	5.6	9.1
Minority status[1]					
Minority	30.0	6.3	16.7	0.0	14.3
Nonminority	10.3	4.5	13.9	3.2	7.5

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

NOTE: Percents may not add to 100 because of rounding and/or "unknown" or "not reported" data categories.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-25
Reasons for GRT trainee attrition prior to Ph.D. completion, by broad focus area, by award cohort: Reporting year 1998

Reason for attrition and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees who terminated Ph.D.	75	114	56	35	280
Left to pursue other academic interests					
Biological Sciences (BIO)	45.5%	50.0%	10.0%	60.0%	40.5%
Computer and Information Sciences and Engineering (CISE)	66.7	6.3	33.3	0.0	20.0
Education and Human Resources (EHR)	0.0	0.0	100.0	66.7	80.0
Engineering (ENG)	25.0	24.1	25.0	17.6	23.2
Geosciences (GEO)	28.6	33.3	16.6	0.0	30.0
Mathematical and Physical Sciences (MPS)	29.2	14.3	28.6	57.1	28.8
Social, Behavioral, and Economic Sciences (SBE)	0.0	0.0	50.0	0.0	12.0
Left to pursue employment					
Biological Sciences (BIO)	36.4	18.8	40.0	40.0	31.0
Computer and Information Sciences and Engineering (CISE)	0.0	81.3	33.3	0.0	53.3
Education and Human Resources (EHR)	0.0	0.0	0.0	33.3	20.0
Engineering (ENG)	50.0	59.3	50.0	52.9	55.6
Geosciences (GEO)	42.9	33.3	14.3	0.0	30.0
Mathematical and Physical Sciences (MPS)	37.5	57.1	28.6	28.6	39.0
Social, Behavioral, and Economic Sciences (SBE)	40.0	50.0	33.3	100.0	44.0
Failed to meet requirements					
Biological Sciences (BIO)	0.0	12.5	0.0	0.0	4.8
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	11.1	50.0	6.7
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	10.0	3.7	12.5	0.0	5.1
Geosciences (GEO)	0.0	16.7	0.0	0.0	5.0
Mathematical and Physical Sciences (MPS)	12.5	7.1	14.3	0.0	10.2
Social, Behavioral, and Economic Sciences (SBE)	0.0	25.0	0.0	0.0	8.0
Left due to family and/or economic constraints					
Biological Sciences (BIO)	9.1	0.0	10.0	0.0	4.8
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	11.1	50.0	6.7
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	5.0	3.7	12.5	23.5	8.1
Geosciences (GEO)	0.0	16.7	14.3	0.0	10.0
Mathematical and Physical Sciences (MPS)	4.2	14.3	14.3	14.3	10.2
Social, Behavioral, and Economic Sciences (SBE)	0.0	12.5	0.0	0.0	4.0
Other					
Biological Sciences (BIO)	0.0	12.5	30.0	0.0	11.9
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	0.0	0.0	0.0
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	10.0	5.6	0.0	5.9	6.1
Geosciences (GEO)	14.3	0.0	42.9	0.0	20.0
Mathematical and Physical Sciences (MPS)	4.2	0.0	14.3	0.0	5.1
Social, Behavioral, and Economic Sciences (SBE)	50.0	12.5	0.0	0.0	24.0

NOTE: Percents may not add to 100 because of rounding and/or data not reported or missing.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-26
Employment status of GRT trainees who terminated Ph.D., by award cohort: Reporting year 1998

Employment status	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
Total trainees who terminated Ph.D.	75	114	56	35	280
Private sector	30.7%	46.5%	26.8%	51.4%	38.9%
Public sector	8.0	5.3	3.6	2.9	5.4
Academic setting	8.0	4.4	7.1	8.6	6.4
Other	9.3	3.5	7.1	0.0	5.4
Graduate study at GRT institution	8.0	11.4	19.6	25.7	13.9
Study outside GRT institution	12.0	11.4	12.5	5.7	11.1
Unknown	24.0	17.5	23.2	5.7	18.9

NOTE: Percents may not add to 100 because of rounding.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-27
Employment status of GRT trainees who terminated Ph.D., by gender and minority status, by award cohort: Reporting year 1998

Employment status and trainee characteristics	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees who terminated Ph.D.	75	114	56	35	280
Private sector					
Gender					
Male	28.9%	54.4%	26.5%	47.1%	42.3%
Female	33.3	29.4	27.3	55.6	34.5
Minority status[1]					
Minority	10.0	43.8	33.3	75.0	35.7
Nonminority	36.2	49.4	25.0	48.4	41.6
Public sector					
Gender					
Male	2.6	5.1	0.0	5.9	3.6
Female	11.1	5.9	9.1	0.0	7.3
Minority status[1]					
Minority	0.0	0.0	16.7	0.0	4.8
Nonminority	5.2	6.7	0.0	3.2	4.7
Academic setting					
Gender					
Male	5.3	5.1	11.8	11.8	7.1
Female	11.1	2.9	0.0	5.6	5.5
Minority status[1]					
Minority	20.0	12.5	16.7	0.0	14.3
Nonminority	6.9	2.2	5.6	9.7	5.1
Graduate study at GRT institution					
Gender					
Male	2.6	7.6	20.6	23.5	10.7
Female	13.9	20.6	18.2	27.8	19.1
Minority status[1]					
Minority	0.0	12.5	16.7	25.0	11.9
Nonminority	10.3	11.2	22.2	25.8	15.0
Graduate study outside GRT institution					
Gender					
Male	18.4	8.9	11.8	11.8	11.9
Female	5.6	17.6	13.6	0.0	10.0
Minority status[1]					
Minority	20.0	18.8	8.3	0.0	14.3
Nonminority	12.1	9.0	11.1	6.5	9.8
Other					
Gender					
Male	15.8	2.5	5.9	0.0	6.0
Female	2.8	5.9	9.1	0.0	4.5
Minority status[1]					
Minority	10.0	0.0	0.0	0.0	2.4
Nonminority	10.3	3.4	11.1	0.0	6.1

Table A-27
Employment status of GRT trainees who terminated Ph.D., by gender and minority status, by award cohort: Reporting year 1998 (Continued)

Employment status and trainee characteristics	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Unknown					
Gender					
Male	26.3	16.5	23.5	0.0	18.5
Female	22.2	17.6	22.7	11.1	19.1
Minority status[1]					
Minority	40.0	12.5	8.3	0.0	16.7
Nonminority	19.0	18.0	25.0	6.5	17.8

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

NOTE: Percents may not add to 100 because of rounding and/or data not reported or missing.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-28
Employment status of GRT trainees who terminated Ph.D., by broad focus area, by award cohort: Reporting year 1998

Employment status and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Total trainees who terminated Ph.D.	75	114	56	35	280
Private sector					
Biological Sciences (BIO)	27.3%	12.5%	20.0%	20.0%	19.0%
Computer and Information Sciences and Engineering (CISE)	33.3	75.0	0.0	100.0	50.0
Education and Human Resources (EHR)	0.0	0.0	0.0	33.3	20.0
Engineering (ENG)	40.0	48.1	62.5	58.8	49.5
Geosciences (GEO)	42.9	33.3	0.0	0.0	25.0
Mathematical and Physical Sciences (MPS)	16.7	42.9	42.9	42.9	32.2
Social, Behavioral, and Economic Sciences (SBE)	40.0	62.5	33.3	100.0	48.0
Public sector					
Biological Sciences (BIO)	9.1	6.3	0.0	0.0	4.8
Computer and Information Sciences and Engineering (CISE)	0.0	6.3	22.2	0.0	10.0
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	5.0	5.6	0.0	5.9	5.1
Geosciences (GEO)	0.0	0.0	0.0	0.0	0.0
Mathematical and Physical Sciences (MPS)	16.7	7.1	0.0	0.0	8.5
Social, Behavioral, and Economic Sciences (SBE)	0.0	0.0	0.0	0.0	0.0
Academic setting					
Biological Sciences (BIO)	18.2	6.3	0.0	20.0	9.5
Computer and Information Sciences and Engineering (CISE)	0.0	6.3	22.2	0.0	10.0
Education and Human Resources (EHR)	0.0	0.0	50.0	0.0	20.0
Engineering (ENG)	10.0	0.0	0.0	5.9	3.0
Geosciences (GEO)	0.0	0.0	0.0	0.0	0.0
Mathematical and Physical Sciences (MPS)	8.3	7.1	7.1	14.3	8.5
Social, Behavioral, and Economic Sciences (SBE)	0.0	25.0	0.0	0.0	8.0
Graduate study at GRT institution					
Biological Sciences (BIO)	9.1	6.3	30.0	40.0	16.7
Computer and Information Sciences and Engineering (CISE)	0.0	6.3	11.1	0.0	6.7
Education and Human Resources (EHR)	0.0	0.0	50.0	33.3	40.0
Engineering (ENG)	10.0	14.8	25.0	23.5	16.2
Geosciences (GEO)	14.3	0.0	14.3	0.0	10.0
Mathematical and Physical Sciences (MPS)	4.2	21.4	14.3	28.6	13.6
Social, Behavioral, and Economic Sciences (SBE)	10.0	0.0	16.7	0.0	8.0
Graduate study outside GRT institution					
Biological Sciences (BIO)	18.2	43.8	0.0	0.0	21.4
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	22.2	0.0	6.7
Education and Human Resources (EHR)	0.0	0.0	0.0	33.3	20.0
Engineering (ENG)	10.0	9.3	0.0	0.0	7.1
Geosciences (GEO)	0.0	16.7	14.3	0.0	10.0
Mathematical and Physical Sciences (MPS)	16.7	0.0	14.3	14.3	11.9
Social, Behavioral, and Economic Sciences (SBE)	10.0	0.0	33.3	0.0	12.0

Table A-28
Employment status of GRT trainees who terminated Ph.D., by broad focus area, by award cohort: Reporting year 1998 (Continued)

Employment status and focus area	Award cohort				All cohorts: 1998
	1992	1993	1994	1995	
Other					
Biological Sciences (BIO)	66.7	0.0	0.0	0.0	0.0
Computer and Information Sciences and Engineering (CISE)	0.0	0.0	0.0	0.0	6.7
Education and Human Resources (EHR)	0.0	0.0	0.0	-	0.0
Engineering (ENG)	0.0	5.6	0.0	0.0	3.0
Geosciences (GEO)	14.3	16.7	42.9	0.0	25.0
Mathematical and Physical Sciences (MPS)	8.3	0.0	7.1	0.0	5.1
Social, Behavioral, and Economic Sciences (SBE)	20.0	0.0	0.0	0.0	8.0
Unknown					
Biological Sciences (BIO)	18.2	25.0	50.0	20.0	28.6
Computer and Information Sciences and Engineering (CISE)	0.0	6.3	22.2	0.0	10.0
Education and Human Resources (EHR)	0.0	0.0	0.0	0.0	0.0
Engineering (ENG)	25.0	16.7	12.5	5.9	16.2
Geosciences (GEO)	28.6	33.3	28.6	0.0	30.0
Mathematical and Physical Sciences (MPS)	29.2	21.4	14.3	0.0	20.3
Social, Behavioral, and Economic Sciences (SBE)	20.0	12.5	16.7	0.0	16.0

[1]Race was coded as minority if race/ethnicity was reported as black, Hispanic, Pacific Islander or American Indian/Alaskan Native. Race was coded as nonminority when race/ethnicity was reported as white or Asian.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-29
Number of GRT course features, by award cohort: Reporting year 1998

Course feature[1]	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
Total number of project awards	38	48	33	38	157
New courses[2] developed by GRT project	18	23	20	18	79
New requirements[3] resulting from GRT project	12	13	15	2	42
New interdepartmental offerings[4] resulting from GRT project	4	5	12	14	35
Seminars, workshops, conferences resulting from GRT project	12	45	36	37	130
Other	3	4	7	16	30
Total new GRT course features	49	90	90	87	316

[1]Projects may report multiple new course features. Numbers reflect counts of new course features, rather than counts of projects reporting new course features.

[2]The number of new course requirements developed by a department to serve the primary GRT focus subfocus area.

[3]The number of new requirements developed by a department for a trainee to complete a doctorate in the primary GRT subfocus area.

[4]The number of interdepartmental courses developed to serve the primary GRT subfocus area.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

Table A-30
Projects reporting GRT course features, by award cohort: Reporting year 1998

Course feature[1]	Award cohort				All cohorts:
	1992	1993	1994	1995	1998
Total number of project awards	38	48	33	38	157
Projects reporting at least one new course feature.	36.8%	54.2%	84.8%	78.9%	62.4%
Projects reporting at least one new course[1]	21.1	22.9	36.4	34.2	28.0
Projects reporting at least one new requirement[2]	5.3	10.4	15.2	5.3	8.9
Projects reporting at last one new interdepartmental offering[3]	10.5	6.3	27.3	26.3	16.6
Projects reporting at least one seminar, workshop, conference[4]	18.4	35.4	57.6	47.4	38.9
Projects reporting some other new course feature	7.9	8.3	12.1	26.3	13.4

[1]Projects may report multiple new course features.

[2]The number of new course requirements developed by a department to serve the primary GRT focus subfocus area.

[3]The number of new requirements developed by a department for a trainee to complete a doctorate in the primary GRT subfocus area.

[4]The number of interdepartmental courses developed.

SOURCE: GRT Distance Monitoring Survey System. Survey completed in 1998.

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